

WORLD HEALTH ORGANIZATION
EXPANDED PROGRAMME ON IMMUNIZATION
**TRAINING FOR
MID-LEVEL MANAGERS**

GILL TREMLETT

**CONDUCT
DISEASE SURVEILLANCE**



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CONDUCT DISEASE SURVEILLANCE

Introduction

Surveillance is DATA COLLECTION FOR ACTION. Specifically, for the Expanded Programme on Immunization (EPI), surveillance is the collection of data about cases of the target diseases and the use of the data to improve actions to prevent these diseases.

Surveillance information can help you first in planning your programme and later in evaluating it. The data will enable you to monitor the effectiveness of the immunization activities and to identify problems. You will be concerned with problems which prevent children from receiving vaccine ("coverage problems") and problems which risk harming the vaccine ("vaccine problems").

To plan and evaluate vaccination activities, you will need to know:

WHO gets the diseases,

WHERE they get them,

WHEN they get them,

WHY they get them.

To prevent the target diseases, disease surveillance must be conducted at every level of the immunization activities: at the health centre, at the region or district, and at the national level. The supervisor of vaccination activities at each level is responsible for ensuring that disease surveillance activities are conducted properly.

At both the health centre and regional levels, supervisors of vaccination activities are responsible for:

1. Ensuring that data are collected properly.
2. Compiling data.
3. Analyzing data.
4. Reporting data.
5. Providing feedback.
6. Determining if an investigation is necessary.
7. Conducting investigations.
8. Ensuring that actions are taken to correct problems which are identified.

The national level evaluates the effectiveness of the immunization activities by analyzing the reports of health centres and regions. These reports must be accurate and must be submitted regularly if they are to be useful.

This module describes the tasks to be performed to conduct disease surveillance at the health centre and regional levels.

PART I: HEALTH CENTRE is written for the person who supervises disease surveillance activities at the health centre. Everyone should work through this section.

PART II: REGION is written for the person who supervises the disease surveillance activities conducted at two or more health centres. If you work at the district or regional level of the vaccination activities, you should work through both sections.

STATEMENT OF PURPOSE

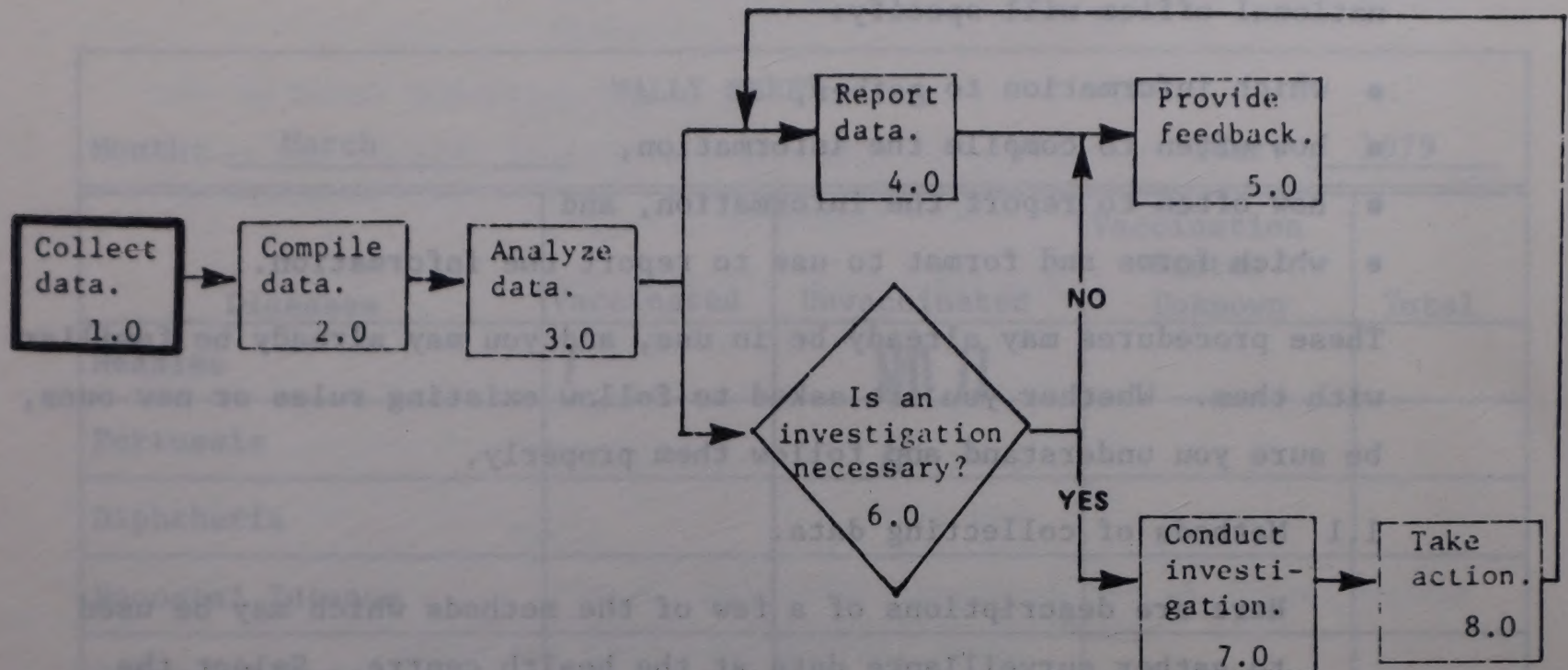
In this module you will practice skills which will enable you to conduct disease surveillance at the level of the vaccination activity for which you are responsible.

FLOWCHART

The diagram on the next page is a flowchart of the tasks to be performed in a disease surveillance system. Each block (□) represents a major step. Read the blocks from left to right or as the arrows indicate, starting with block 1.0. The diamond-shaped block (Δ) indicates that a decision must be made. Based on the decision (yes or no), follow the arrow to the appropriate next block.

The flowchart is the same for PARTS I and II because the major steps performed at the two levels are the same, even though the specific tasks are different. If you have any questions about the flowchart, ask a Course Manager for help.

PART I: HEALTH CENTRE



1.0 COLLECT DATA.

Data collected at the local level are used:

- To decide at the local level whether changes in the programme are necessary.
- To decide at higher levels whether changes in the programme are necessary.

Information collected locally should be analyzed locally. Then the people who actually conduct the vaccination activities can monitor the effect of their work and, if necessary, change or improve their method of work so they can meet their disease-reduction objectives.

Although the primary purpose of gathering surveillance data at the local level is for use at this level, it is also important that data from each local area be reported to the next higher level. The supervisor there can then analyze the data from the entire region and inform you of situations which could affect the vaccination activities in your area.

The procedures you will follow to collect and report surveillance data will be determined at the regional or national level. The regional or national office will specify:

- which information to gather,
- how often to compile the information,
- how often to report the information, and
- which forms and format to use to report the information.

These procedures may already be in use, and you may already be familiar with them. Whether you are asked to follow existing rules or new ones, be sure you understand and follow them properly.

1.1 Methods of collecting data.

Here are descriptions of a few of the methods which may be used to gather surveillance data at the health centre. Select the method that is most appropriate to the needs of your centre and that will yield the most accurate information.

- Outpatient Register.

If you keep a register in which patients' names, diagnoses, and other information are recorded, review the register at the end of the day, count the number of cases of each of the target diseases, and record the numbers on a tally sheet.

- Individual Patient Records.

Review the patient records at the end of the day, count the number of cases of each of the target diseases, and record the numbers on a tally sheet.

- Tally Sheet.

You may have a sheet similar to the sample shown in Figure 1 on which to record the number of cases of the target diseases which come to your health centre. Each time you diagnose a case of one of the target diseases, place a tally mark ("|") represents one case of a disease. For instance, the tally sheet in Figure 1

indicates that there were two cases of pertussis in unvaccinated persons, not eleven cases.

TALLY SHEET				
Month: <u>March</u>		Year: <u>1979</u>		
Diseases	Vaccinated	Unvaccinated	Vaccination Status Unknown	Total
Measles	/	11		
Pertussis		2		
Diphtheria				
Neonatal Tetanus				
Other Tetanus		/		
Poliomyelitis		/		
Tuberculosis				

Figure 1.

1.2 Types of data to collect.

Ideally you will collect the following data for each case of the target diseases:

Disease

Vaccination status

Date symptoms began

Age

Name

Address

If you collect all of this information for each patient, you will be able to analyze your data in order to learn the number of cases of the target diseases which are occurring in your area, where they are occurring, when they are occurring, who is getting sick, and why. Not all programmes require such detailed information. At a minimum, however, you should collect data on the disease and vaccination status of each case.

This information can help you in the collection of data:

- Diagnosis of Diseases.

Here are some important signs (evidence found by the examiner) and symptoms (sensations felt by the patient) of the target diseases:

Measles

High fever ($39-40^{\circ}\text{C}$)

Cough

Rash

Red eyes

Pertussis (Whooping Cough)

Cough lasting more than two weeks

Classic "whoop" when inhaling after a long, difficult cough

Vomiting after coughing

NOTE: Infants less than 3 months old may have severe or even fatal pertussis infection without the typical "whoop." The disease may simply appear to be pneumonia.

Tetanus

Newborn (neonatal):

Infant normal at birth

Begins breast feeding normally

Stops taking breast milk after 2nd or 3rd day

Spasms and "risus sardonicus" (a grinning expression produced by spasm of the facial muscles)

Dies before 14th day of life

Adult:

Severe muscular spasms and "risus sardonicus"

May occur after childbirth

May occur after penetrating wound

Diphtheria

Severe throat infection with gray-colored membranes
May be accompanied by muscle weakness and heart failure

Tuberculosis

Cough for more than a month
Coughing up blood
May resemble pneumonia
Fever
Night sweats
Weight loss

Polio

Normal child until sudden onset of fever, muscle weakness, and possible paralysis
Paralysis usually affects one side of the body more than the other
Normal feelings in paralyzed limbs

Remember, these are the most common features of the diseases. Not all cases will have all of them, and there may be others which are not mentioned here. For diseases such as diphtheria and tuberculosis, laboratory tests may be needed in order to be sure of the diagnosis. Since not all health centres have access to laboratories, however, it will often be necessary to rely on the diagnosis made on the basis of signs and symptoms alone. Therefore, ensure that all staff members know the important signs and symptoms of the diseases and can make an accurate diagnosis.

● Vaccination Status.

You need to know the vaccination status of each person who has a case of one of the target diseases so that you can determine if persons are getting the diseases because they were not fully vaccinated or because they were vaccinated with ineffective vaccine.

If a person has received only part of the series of multi-dose vaccinations against pertussis, tetanus, diphtheria, or polio, he is not fully protected against the disease. On the other hand, if a person has received the full series of multi-dose vaccinations against a disease at the proper age and with good vaccine, he should be protected.

Occasionally an individual who is fully vaccinated at the correct age with good vaccine will develop a case of one of the target diseases. This is not because something was wrong with the vaccine, but because the person's body did not respond properly to the vaccine. If only a small number of cases occurs in properly-vaccinated persons, you should not suspect that there is a major problem in your vaccination activities. However, if a large number of cases occurs in fully-vaccinated persons, you should assume that something is wrong.

"Fully vaccinated" means something different for the different diseases, as shown in the following list:

Measles - one dose at or after the age of nine months.

Tuberculosis - one dose.

Diphtheria	}	two doses, with an interval of at least one month between doses.
Tetanus		

Pertussis	}	three doses, with an interval of at least one month between doses.
Poliomyelitis		

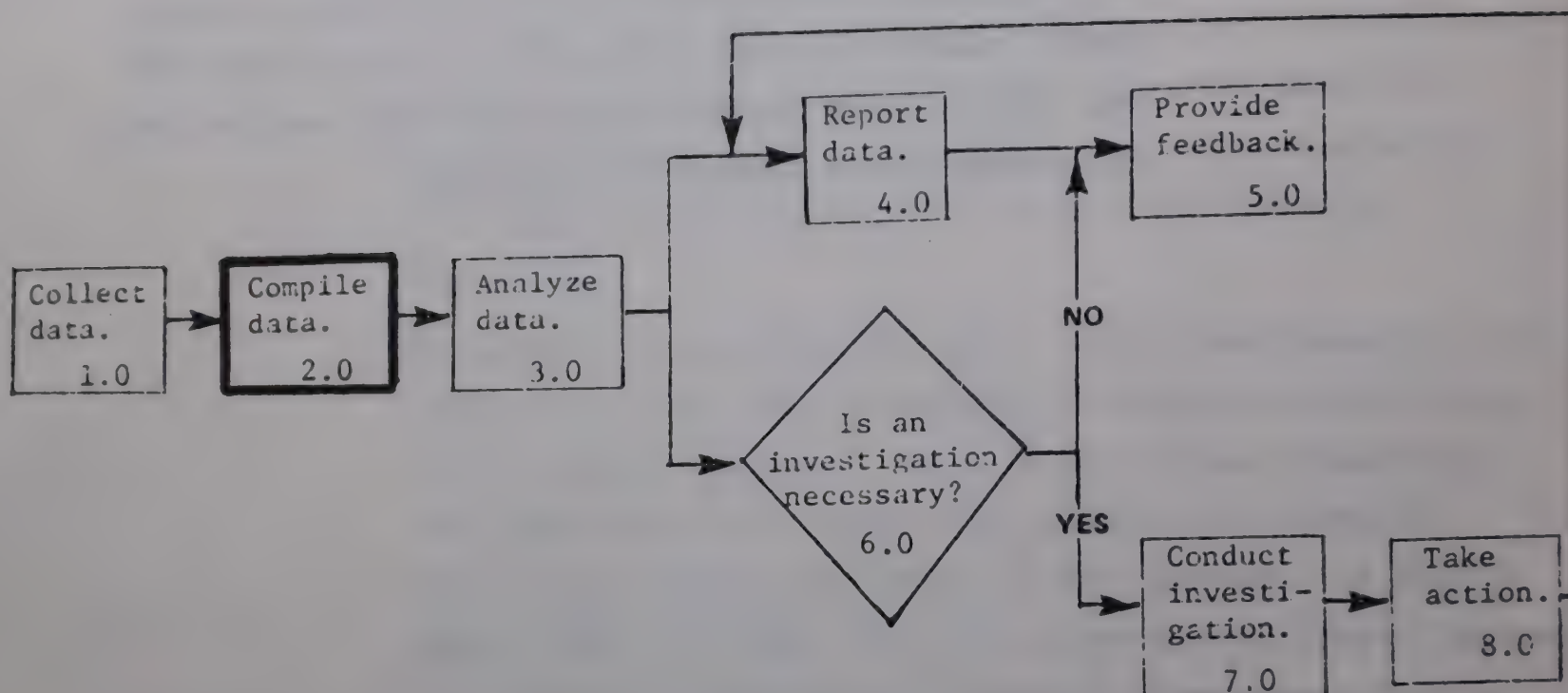
For example, if a case of paralytic polio occurs in a person who has had only one dose of polio vaccine, this case will be recorded as "unvaccinated."

- Date Symptoms Began.

In the outpatient register or the individual patient chart, record the date on which the symptoms of the disease began so you will know when the disease affected your area.

• Name and Address.

In the outpatient register or the individual patient chart, record the name and address of each person who has one of the diseases so you will know exactly where the disease is occurring in your area.



2.0 COMPILE DATA.

Since it is your responsibility to reduce the number of cases of the target diseases in your area, you need to know how many cases are occurring, and where they are occurring.

In order to monitor the incidence (number of new cases in a defined population during a specified period of time) of the diseases in your area, you should maintain charts and graphs which show the number of cases of the diseases for each reporting period. It will be especially useful to keep charts and graphs for measles and pertussis since these are the diseases that occur most often. If your immunization programme is effective, it will have a dramatic impact on preventing measles and pertussis, and you can show this on your charts and graphs. The other four target diseases usually occur in much smaller numbers, so disease charts or graphs are not as useful.

2.1 Disease charts.

Figure 2 is a sample chart for the number of cases of measles reported per month at a health centre in 1979. The chart is filled in for January through May.

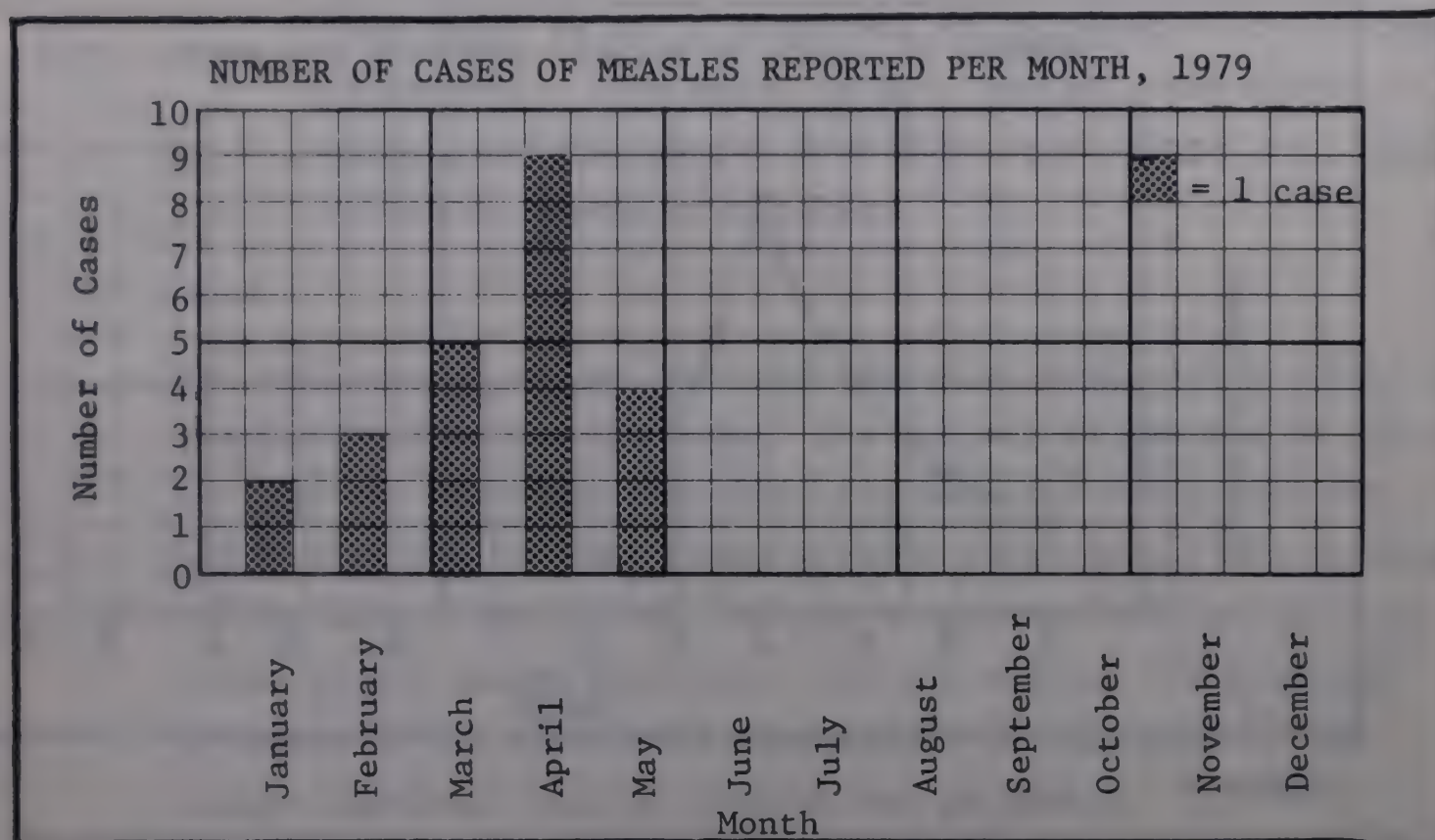


Figure 2.

By looking at this chart, it is easy to determine how many cases of measles were recorded at this health centre each month. For example, according to this chart, 2 cases of measles were reported in January, and 9 were reported in April.

2.1.1 On the first day of each reporting period, count the number of cases of the disease which were diagnosed at your centre during the previous reporting period.

2.1.2 In the space for the previous reporting period on your chart, draw a bar representing the number of cases diagnosed.

2.2 Disease graphs.

You may wish to make a graph rather than a chart. Figure 3 is a sample graph for the same number of cases of measles reported per month in 1979 as in Figure 2.

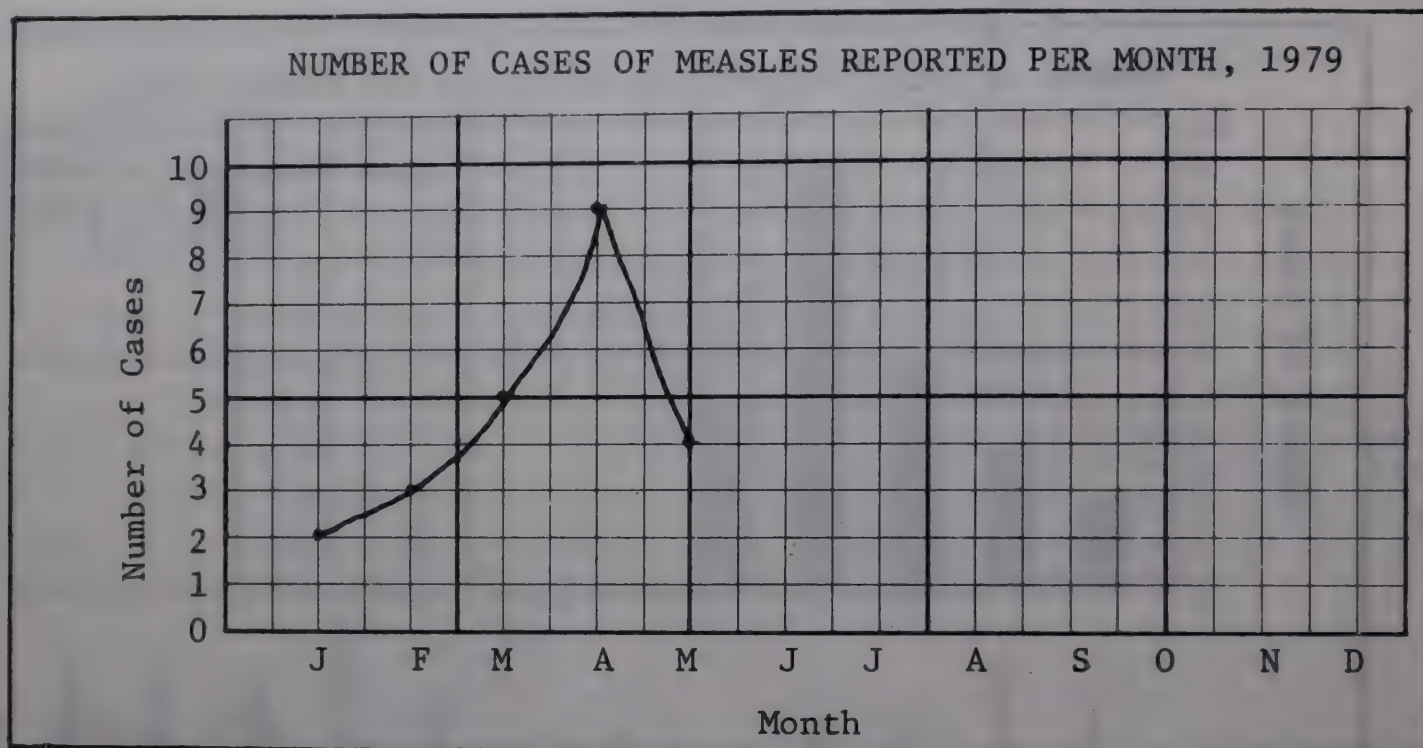


Figure 3.

As with a disease chart, it is easy to determine the number of cases of measles which occurred each month by looking at the graph.

In order to maintain a disease graph, perform the following tasks:

- 2.2.1 On the first day of each reporting period, count the number of cases of the disease which were diagnosed at your centre during the previous reporting period.
- 2.2.2 Place a dot on the graph directly above the mark for that reporting period and directly across from the number of cases diagnosed.
- 2.2.3 Draw a line from the previous dot to the new one, so that you will have a clear picture of the trend in the incidence of disease. If the line goes down from

left to right, the number of cases is decreasing; if the line goes up from left to right, the number of cases is increasing. For example, according to the graph on page 12 (Figure 3), you can see the number of cases reported in March was 5, and in April, 9, so from March to April there was an increase in the incidence of measles. From April to May, however, the number of cases reported dropped from 9 to 4, so there was a decrease in the incidence of measles.

2.3 Maps.

You will need a map of the area served by your health centre and population data for the area. The map may be similar to the one on page 14. This map will help you know the exact area for which your health centre must provide services and the geography of the area. You may use the map to monitor the locations of cases of the target diseases. You may monitor the locations of cases of all the target diseases or of only some of the target diseases, such as measles and pertussis.

In order to monitor the locations of cases of the target diseases, perform the following tasks:

2.3.1 Place pins or draw dots on the map to indicate the villages where cases of the target diseases are recorded.

- If you are monitoring locations of cases of more than one of the target diseases, use coloured pins or dots, with each colour representing a different disease. For example, you could use red for measles, blue for pertussis, yellow for polio, etc.
- If the number of cases of a disease reported in your area is usually very large, you may use a pin or dot to represent more than one case.

For example, if you use a pin or dot to represent 5 cases of pertussis, you will place a pin or dot on the map at a village only when the number of cases of

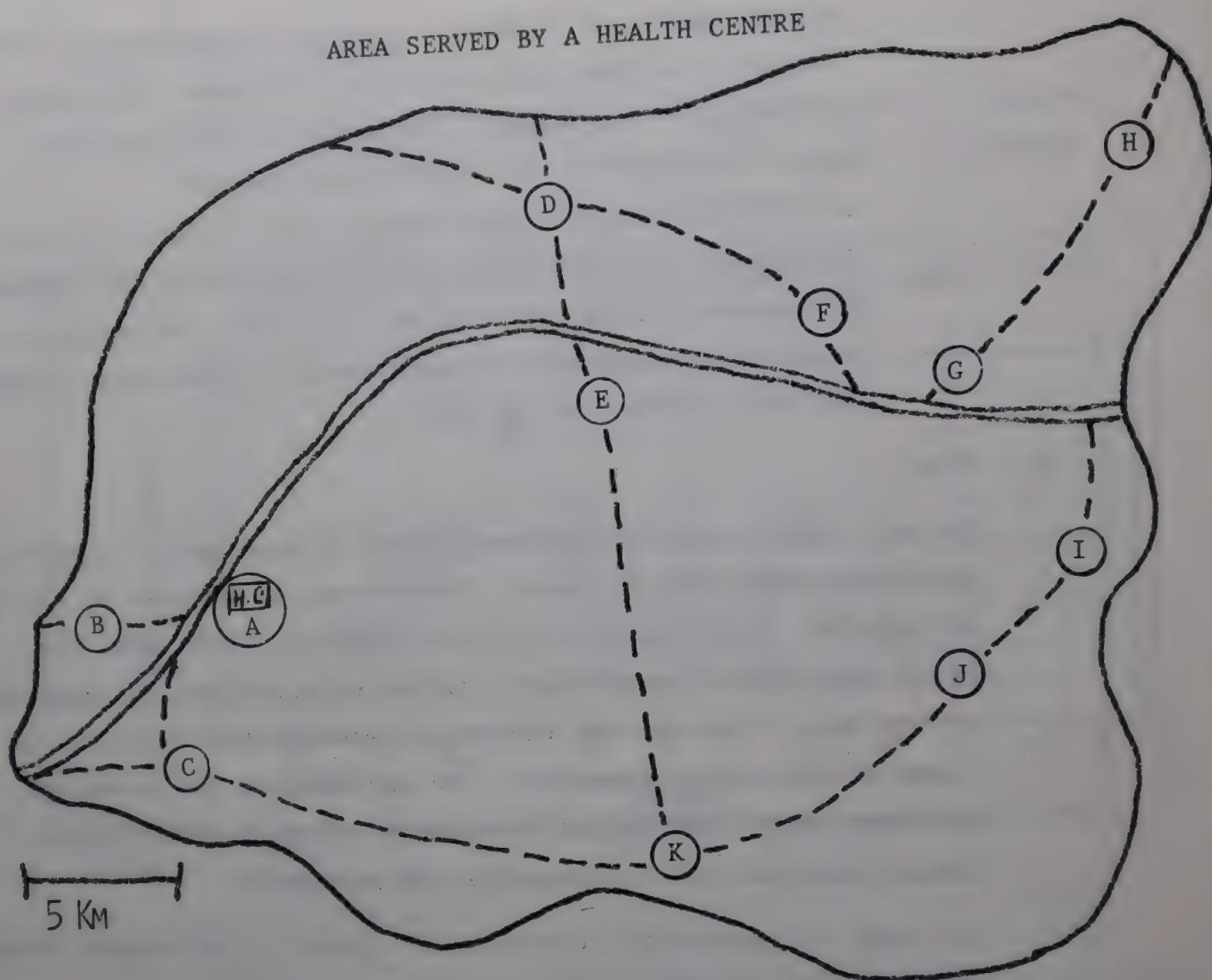
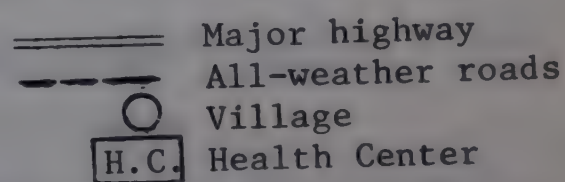


Figure 4.



Village:	Population:
A	6,000
B	1,200
C	1,000
D	1,500
E	1,800
F	1,000
G	1,800
H	1,200
I	800
J	900
K	1,700
Rural population	<u>21,000</u>
Total population	40,000

pertussis reported at that village during the reporting period reaches 5 or a multiple of 5 (that is, 5, 10, 15, 20, 25, etc.). Therefore, if 4 cases of pertussis are recorded in your village on 1 March, the first day of the reporting period, you will not place a pin or dot on the map because less than 5 cases have been recorded.

Then, if 3 cases are recorded on 2 March, the number of cases during the reporting period will be 7, so you will place a pin or dot on the map at your village. You will place a second pin or dot on your village when the number of cases of pertussis reported in the village during this reporting period reaches 10, a third pin or dot when the number of cases reported reaches 15, and so on.

- Remember that not all cases of the target diseases which are diagnosed and recorded at the health centre occur in the village where the health centre is located. Be sure to place the pins or dots at the villages where the cases occur.
- This information will help you in your analysis of the disease situation in your area. You will not only be able to keep a count of the numbers of cases that occur, but you will be able to tell exactly where they are occurring by just looking at the map. The map will also help you in determining how serious the disease situation is in the villages in your area. For example, if your map shows that during the previous month 20 cases of measles were reported in each of 2 villages, one with a population of 6,000 and one with a population of 500, you could easily see that the smaller village has a much more serious problem than the larger village.

2.3.2 On the first day of each reporting period, record in a notebook the number of cases that occurred at each village during the previous reporting period.

By keeping this kind of data for your area, you will be able to analyze the disease situation in your area better than if you do not monitor the locations of the cases of the target diseases.

2.3.3 After you have recorded the number of cases of the target diseases in each village, remove all the pins from the map.

Exercise A

Instructions: The following are data about the number of cases of measles reported in one health centre from January through April.

Use the data to do steps 1 and 2 on page 18. When you have completed this exercise, do Exercise B.

The numbers of cases of measles counted in the health centre for the first three months of the year were as follows:

January: 35

February: 23

March: 28

Figure 5 is the tally sheet of the number of measles cases diagnosed in this health centre during April.

NUMBER OF MEASLES CASES: APRIL					
2/4	3/4	4/4	5/4	6/4	7/4
<u>II</u>	<u>O</u>	<u>I</u>	<u>I</u>	<u>I</u>	<u>O</u>
9/4	10/4	11/4	12/4	13/4	14/4
<u>III</u>	<u>O</u>	<u>I</u>	<u>I</u>	<u>II</u>	<u>O</u>
16/4	17/4	18/4	19/4	20/4	21/4
<u>I</u>	<u>O</u>	<u>II</u>	<u>O</u>	<u>II</u>	<u>I</u>
23/4	24/4	25/4	26/4	27/4	28/4
<u>I</u>	<u>II</u>	<u>II</u>	<u>O</u>	<u>I</u>	<u>O</u>
30/4					
<u>I</u>					
Total number of cases: _____					

Figure 5.

1. Determine the total number of cases diagnosed during April and write the answer in the space in the bottom right-hand corner of the tally sheet.
2. Prepare a chart or graph showing the number of cases of measles reported per month from January through April. Use the worksheet provided on page 19 to do your work.

Worksheet for Exercise A

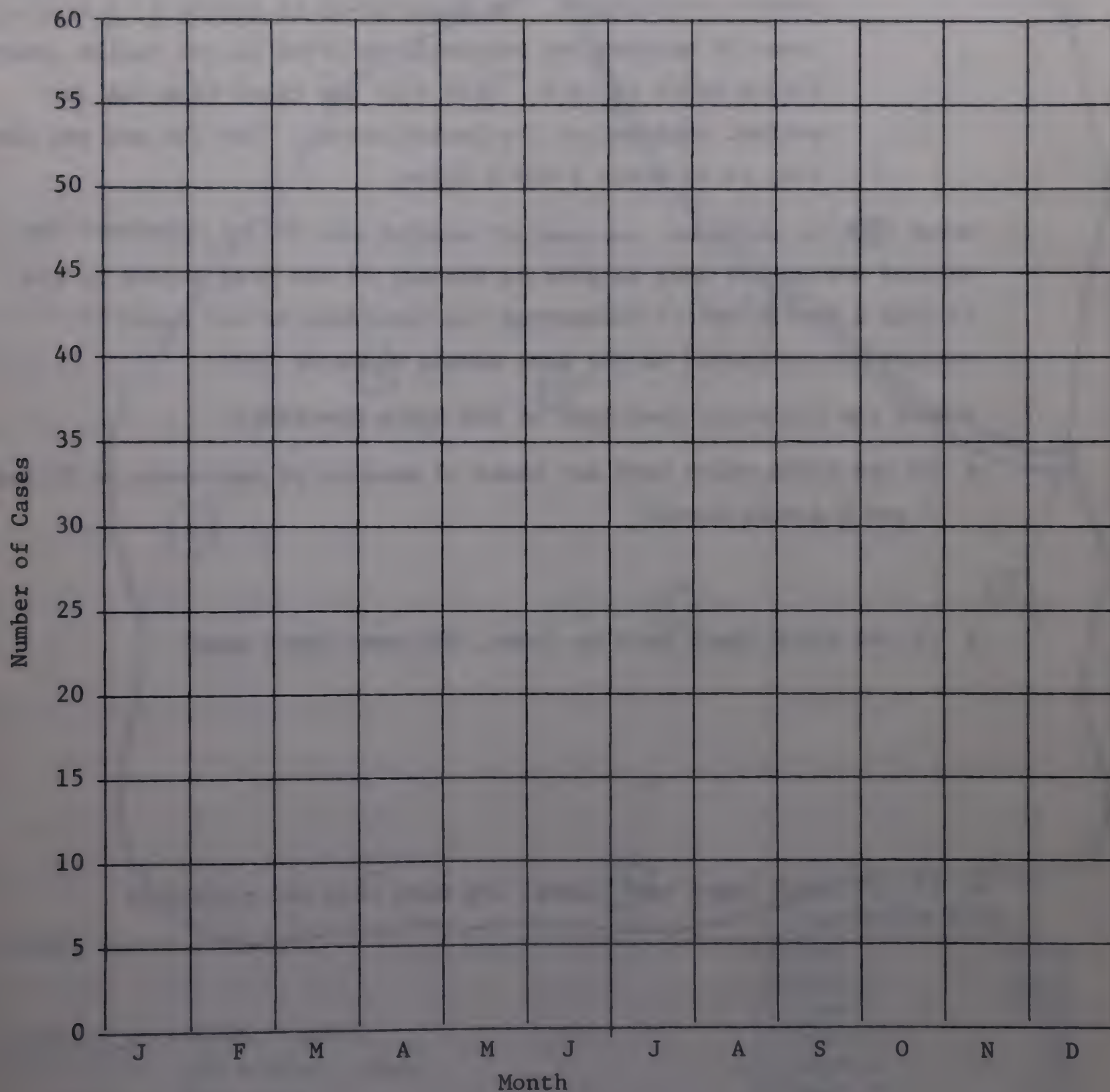


Figure 6.

Exercise B

Instructions: Figure 7 on page 21 is a map of the area served by the health centre at Village A. On pages 22-23 is Figure 8, a list of the cases of measles and pertussis recorded at the health centre during March of 1979. This list was taken from the out-patient register at the health centre. Use the map and the list to do steps 1 and 2 below.

1. Using "⊗" to represent one case of measles and "0" to represent one case of pertussis, draw in dots on the map of the area served by the Village A health centre indicating the locations of the cases of measles and pertussis in the area during March of 1979.
2. Answer the following questions in the space provided:
 - Do you think there were any cases of measles or pertussis in Villages F and G during March?
 - If you think there were no cases, why were there none?
 - If you think there were cases, why were they not reported?

When you have completed this exercise, discuss your answers to both Exercises A and B with a course manager.

AGE A
CENTRE

HC
A

E

B

G

C

F






D

Population Data

7

111

5,000

	major highway
	all weather roads
	foot path
	village
	Health Centre

A horizontal line with vertical end caps, labeled "5KM" below it.

VILLAGE A HEALTH CENTRE

List of cases of measles and pertussis,
taken from Outpatient Register

Month: March

Year: 1979

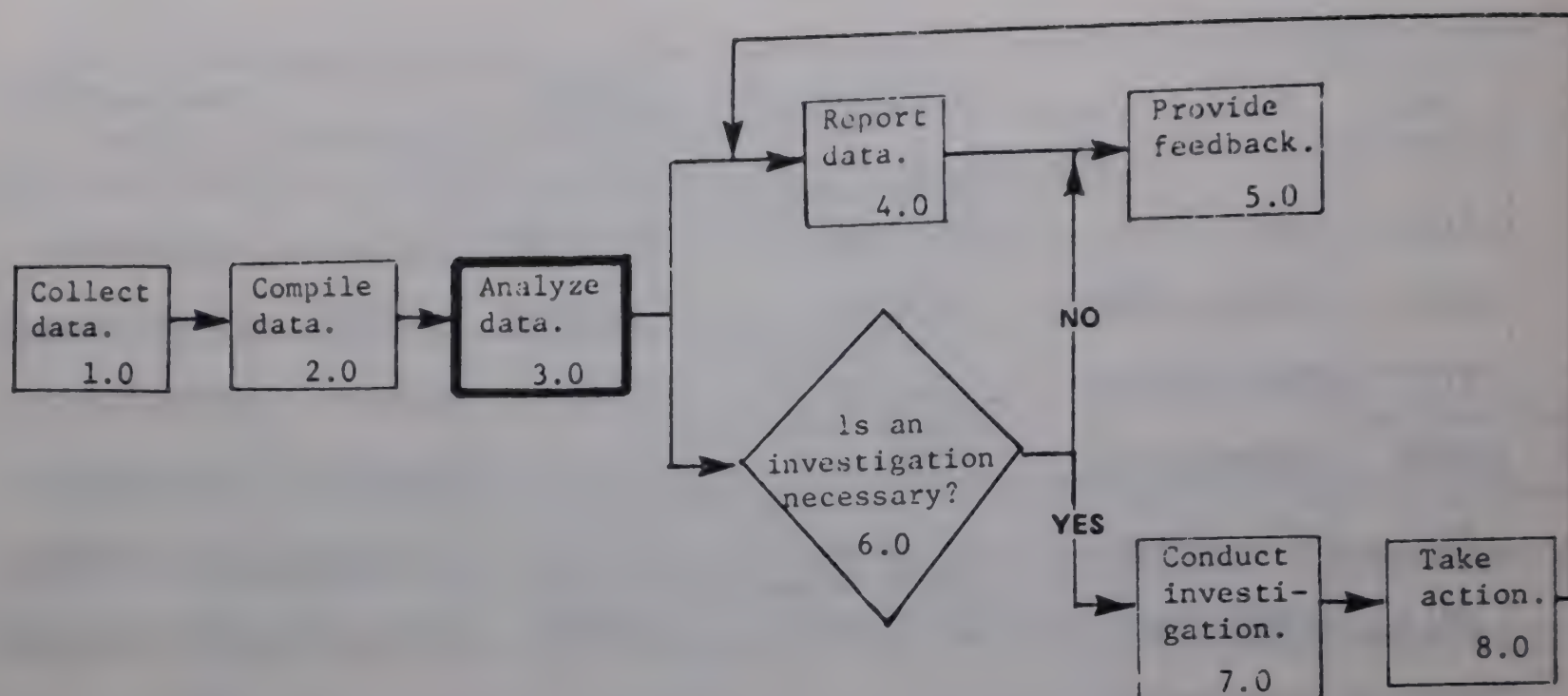
Date	Patient's Name	Patient's Address	Date of Birth	Diagnosis	Vaccination Status
1/3	Balla Ba	Church Road, Village A	2/3/78	measles	Unvaccinated
2/3	Abu Idris	Near market, Village A	5/4/78	pertussis	Unvaccinated
5/3	Peter Tawai	Village C	17/1/78	measles	Unvaccinated
5/3	Fetuma Braun	Village D	21/7/78	pertussis	Unvaccinated
7/3	Muh Mustapha	Koundo Road, Village A	3/12/77	measles	Unvaccinated
9/3	Nora Komen	Main road, Village B	13/6/78	pertussis	Unvaccinated
13/3	Abdullah Shadrass	Near market, Village A	28/2/76	measles	Unvaccinated
13/3	Bija Ruet	Near river, Village B	14/5/78	pertussis	Vaccinated
14/3	Joshua Famuina	Village C	16/2/78	measles	Vaccinated
15/3	Ruth Lasiso	Near store, Village A	30/1/77	measles	Unvaccinated
16/3	Ara Teru	Near store, Village A	10/2/78	measles	Vaccinated
16/3	John Sadago	Village E	31/12/77	measles	Unvaccinated
19/3	Andrew Leke	Mountain Road, Village B	11/9/75	measles	Unvaccinated
19/3	Maum Lati	Near market, Village A	1/7/78	pertussis	Vaccinated
22/3	Alan Taru	Village D	9/6/77	measles	Unvaccinated
23/3	Bali Kestapa	Church Road, Village A	22/5/76	measles	Unvaccinated
26/3	George Changei	Near store, Village A	8/7/78	pertussis	Unvaccinated
26/3	Loni Saddris	Village C	16/12/77	measles	Unvaccinated

Figure 8

--continued

Date	Patient's Name	Patient's Address	Date of Birth	Diagnosis	Vaccination Status
27/3	Taure Kurai	Near market, Village B	8/1/78	pertussis	Vaccinated
27/3	Joseph Turan	Village C	21/3/78	measles	Unvaccinated
27/3	Malah Mbaye	Atumone Road, Village A	23/1/77	measles	Unvaccinated
28/3	Obanu Kone	Main road, Village B	17/1/78	measles	Unvaccinated
30/3	Okol Assam	Village C	15/7/78	pertussis	Unvaccinated
30/3	Kioki Daru	Near market, Village A	20/9/77	pertussis	Unvaccinated

Figure 8.



3.0 ANALYZE DATA.

After you have compiled the data from the most recent reporting period, analyze it. Compare the number of cases with the numbers reported during previous reporting periods and with the same reporting period of previous years. Are the numbers higher, lower, or about the same? Whatever the answer, you have not completed your analysis until you have explained the most probable reason for it.

Four factors which influence the number of cases of a disease which will be reported are:

- the completeness of reporting
- the vaccination coverage
- the seasonal variation
- the epidemic pattern

3.1 Completeness of reporting.

Changes in the number of reported cases can be caused by real changes in the incidence of disease or by changes in the way that cases are being reported. Two major changes in reporting will be caused by changes in the number of people coming to the health centre and changes in the skill and interest of the health workers

in diagnosing and recording the cases they see. If neither of these have changed since previous reporting periods, you can be more confident that comparing the reported cases with those of past periods will tell you what is actually happening to the diseases. When you start an immunization programme, this may encourage more people to come to the health centre, and you may at the same time be increasing the interest and skills of the health staff. So, early in your programme you may report an increase in cases, and this may be a sign of improvement!

3.2 Vaccination coverage.

After immunization activities have been started or increased, the number of cases of the target diseases should decrease. For instance, if you succeed in immunizing 50% of your target population against measles, you will expect the number of cases of measles to be lower than it would be if no children were vaccinated. There will still be a large number of children who have not been vaccinated, however, so there may still be many cases of measles.

If all children in the target population are vaccinated at the proper age with good vaccine, there will be very few cases of measles. There will probably still be a few cases, however, even with 100% coverage, because people will move from other areas to your area. Also, remember that about 5% of children who are fully vaccinated at the proper age with good measles vaccine are not protected because their bodies do not respond to the vaccine.

3.3 Seasonal pattern.

Some diseases occur in seasonal patterns. There is a season in which more cases occur than at any other time during the year. The seasonal patterns for polio, measles, and pertussis are often clear and are much more noticeable than those for tuberculosis, diphtheria, and tetanus. Poliomyelitis, for instance, usually occurs more in the summer than in the winter,

and measles and pertussis occur more in the spring than in any other season.

Figure 9, a graph of measles cases for a one-year period, clearly shows the variation in the number of measles cases. Notice that the maximum number of cases occurred in April and the minimum number occurred in December.

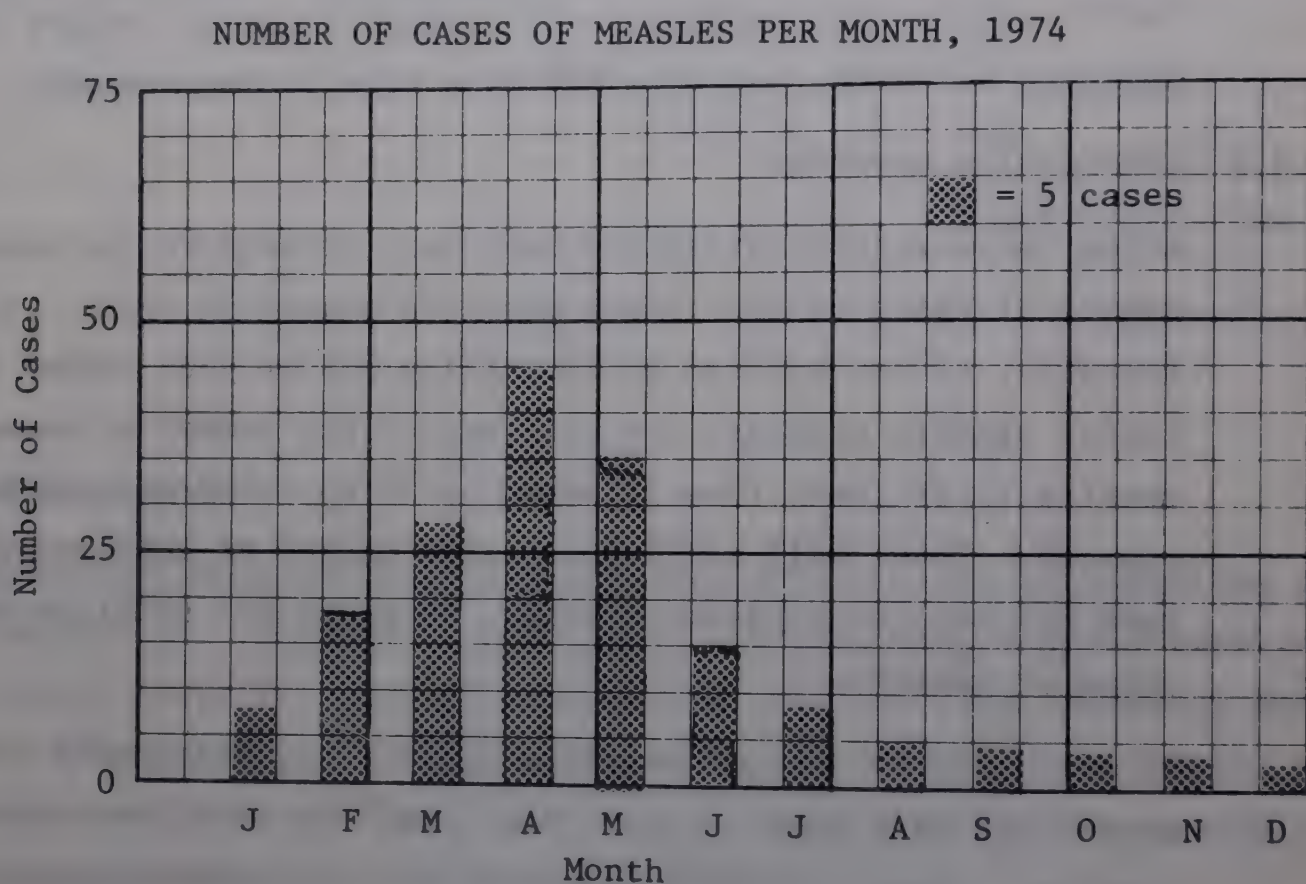


Figure 9.

Total Cases: 173

3.4 Epidemic pattern.

An "epidemic" is defined as the occurrence in a community or region of cases of an illness clearly in excess of the usual incidence. Some diseases naturally occur in epidemic and non-epidemic years. That is, an epidemic year will occur, followed by 1, 2, 3, or more years with relatively few cases of the disease, followed by another epidemic year.

By extending the graph of measles cases to cover several years (see Figure 10 on the following page), it becomes clear that measles follows this pattern. Notice that many cases occurred in the epidemic years: 1974, 1976, and 1978.

NUMBER OF CASES OF MEASLES REPORTED, 1974-1978

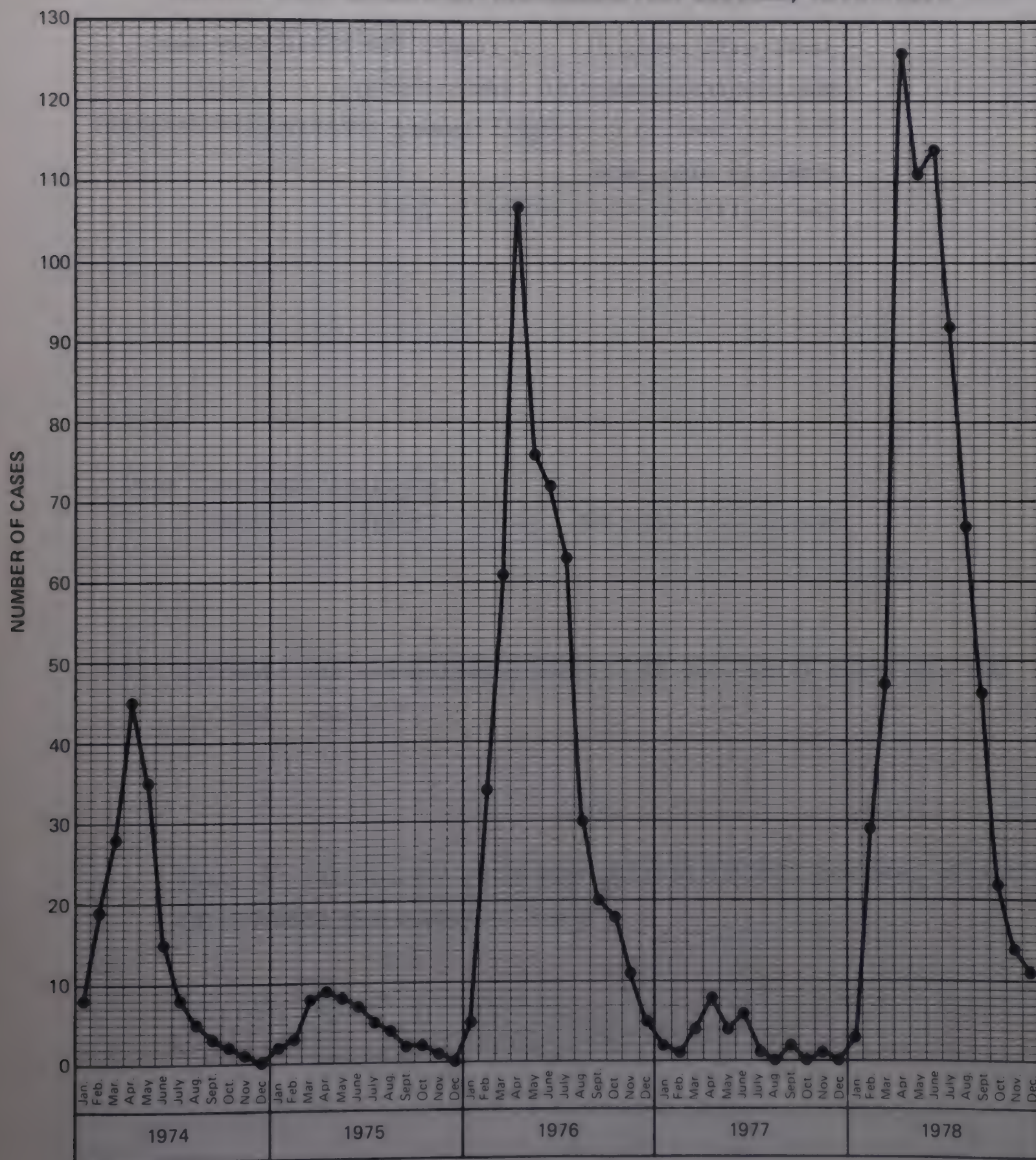


Figure 10

Because of these many factors which influence the number of cases which will be reported, you will need to review with care the possible reasons for increases, decreases, or lack of change in cases reported by your health centre. You can only be satisfied with your immunization programme if you know that:

- staff will recognize and report the cases they see;
- the reported number of cases is low;
- the vaccination coverage of young children and pregnant women is high; and
- the quality of the vaccine is good.

Exercise C

Instructions: Refer to the graph on page 30, NUMBER OF CASES OF MEASLES REPORTED, 1972-1978 (Figure 11) in order to answer the questions below. Write your answers in the spaces provided after each question. When you have completed this exercise, do Exercise D.

1. According to the graph, what is the trend in the number of cases in the area from 1972 through 1978?

2. Does the graph indicate:
 - a. A seasonal pattern? If yes, describe the pattern.

 - b. Epidemic and non-epidemic years? If yes, which years are the epidemic years?

 - c. That the vaccination programme started in 1975 has been effective in reducing the number of cases?

NUMBER OF CASES OF MEASLES REPORTED, 1972-1978

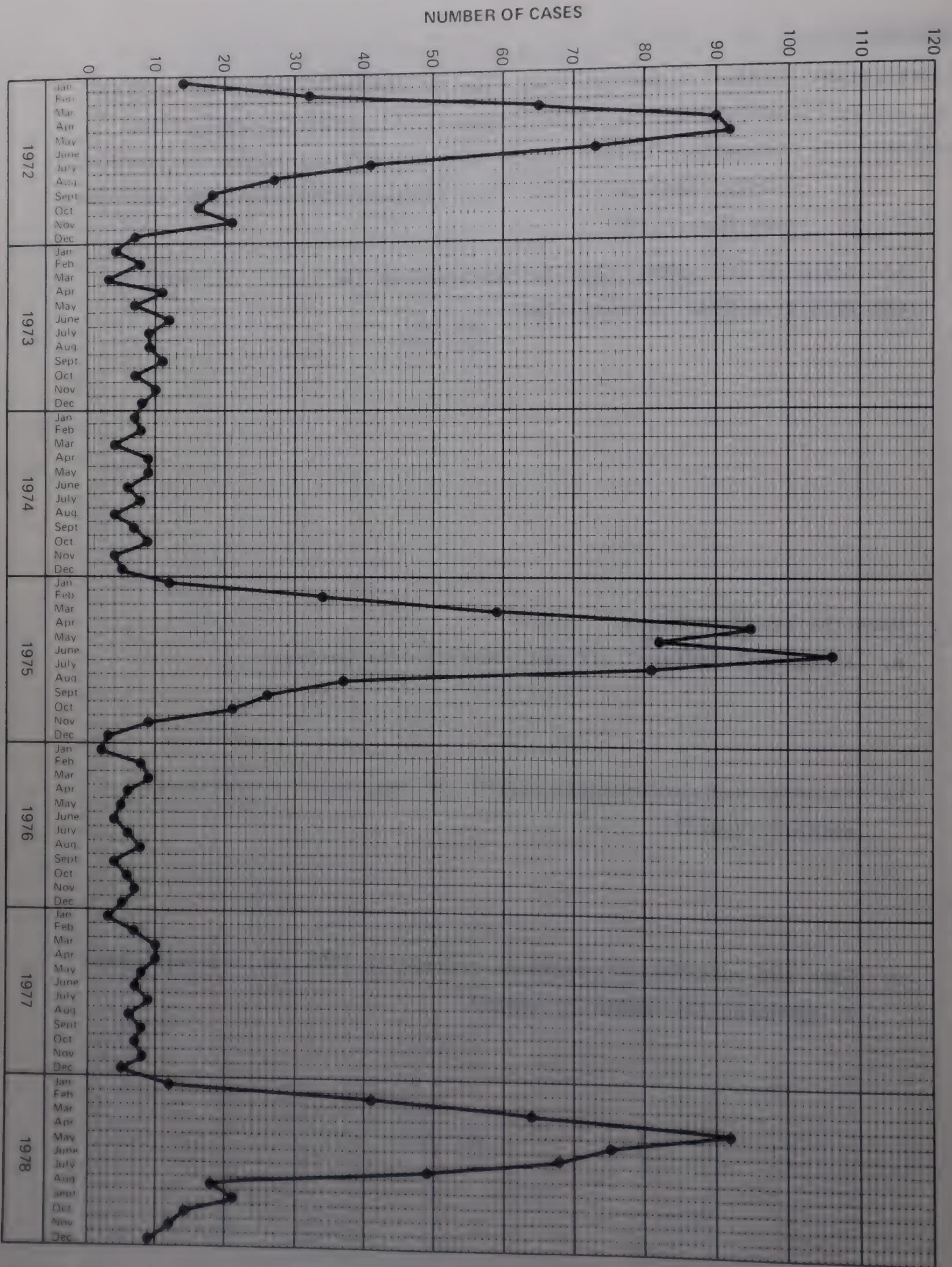


Figure 11

Exercise D

Instructions: Refer to the graph in Figure 12 below and answer the question that follows it in the space provided.

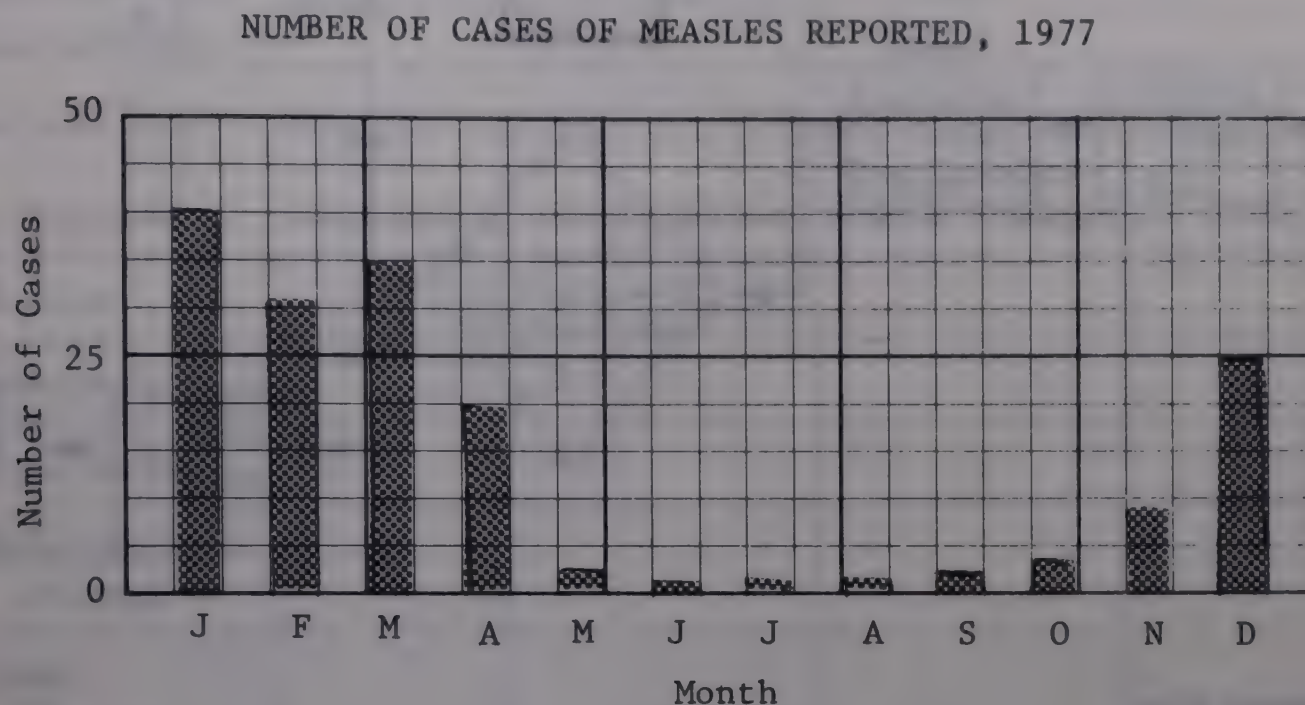
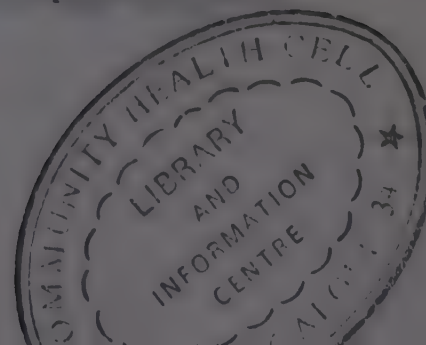


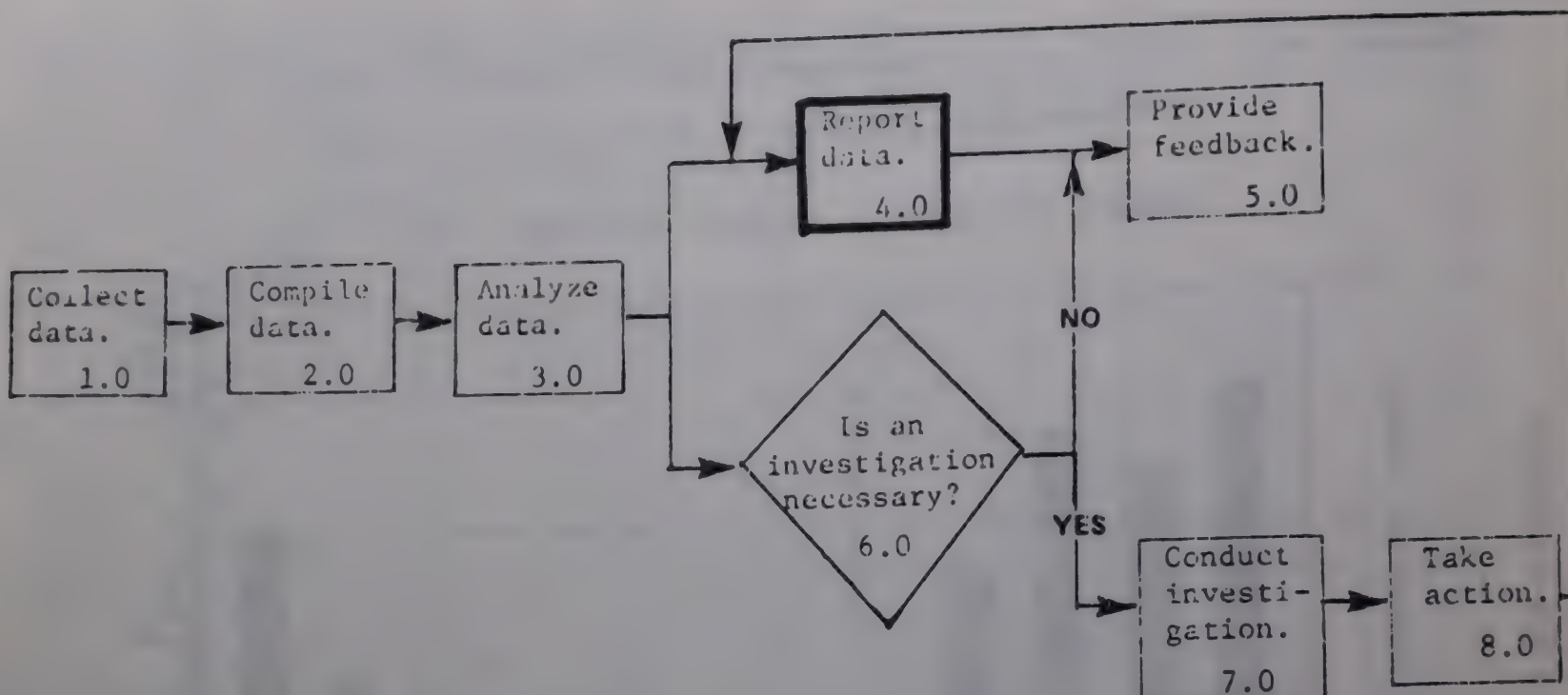
Figure 12.

What are the possible explanations if the case count in January of 1978 is:

- 60?
- 30?
- 10?

Discuss your answers with a course manager when you have completed this exercise.





4.0 REPORT DATA.

On the first day of each reporting period, after you have analyzed data for the previous reporting period, prepare the regular surveillance report and send it to the regional supervisor.

It is essential that the report be sent to the regional supervisor promptly so that he can determine if action at his level is required.

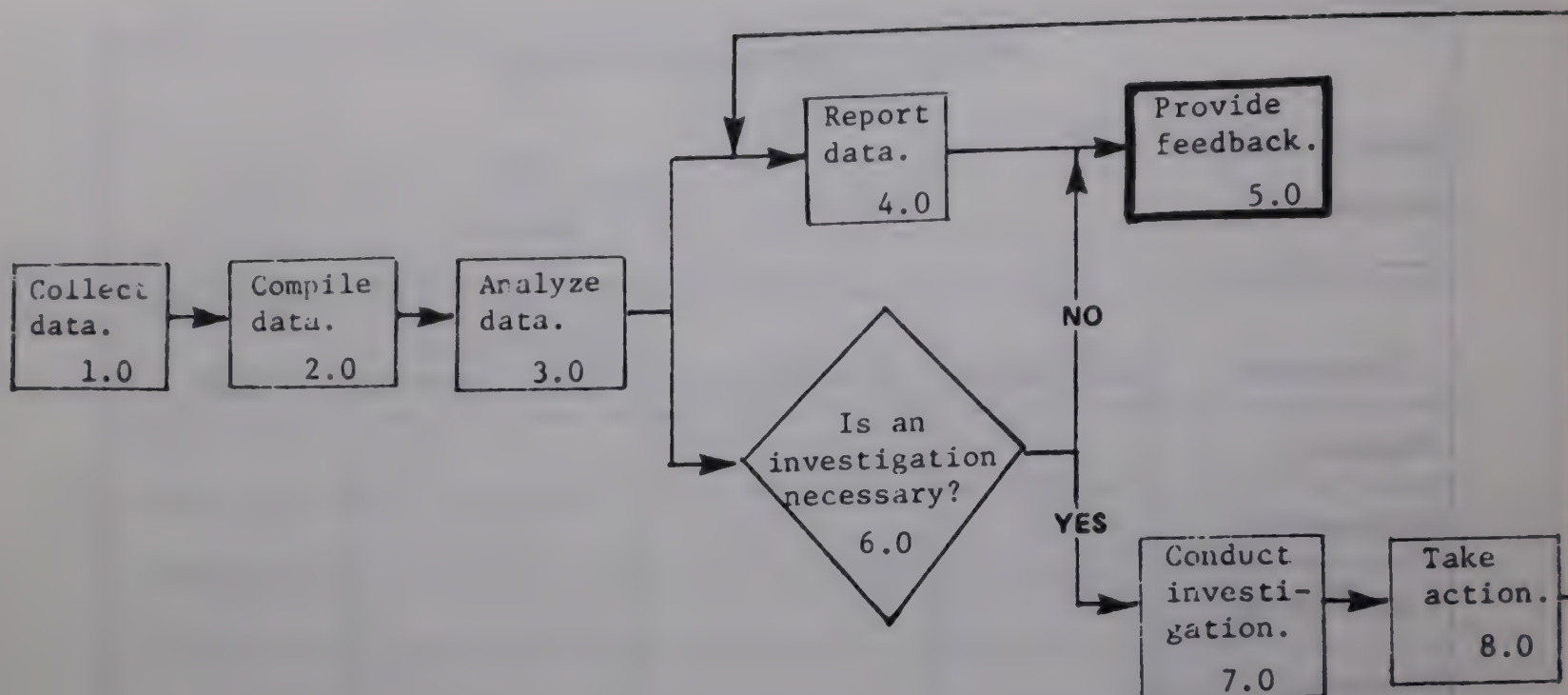
The reports you will use and the time for submitting them will probably be established at the regional or national level of the immunization programme.

A sample Monthly Surveillance Form is shown in Figure 13 on page 33.

If your analysis of the data has led you to decide to conduct an investigation, include this information in your report. Section 6.0, pages 36 through 37, gives guidelines on how to determine if an investigation is necessary. If you have already conducted an investigation, prepare and send in a copy of the report of your findings from the investigation as well as the regular surveillance report.

MONTHLY SURVEILLANCE REPORT				
Health Centre: _____		Year: _____		
Region: _____		Month: _____		
Diseases	Vaccinated	Unvaccinated	Vaccination Status Unknown	Total
Measles				
Pertussis				
Diphtheria				
Neonatal Tetanus				
Other Tetanus				
Poliomyelitis				
Tuberculosis				
<p>Submitted by: _____ <div style="text-align: center;">Supervisor of Vaccination Activities</div> </p> <p>Date: _____</p> <p>Received by: _____</p> <p>Date: _____</p>				

Figure 13.



5.0 PROVIDE FEEDBACK.

The term "feedback" refers to:

- informing health centre staff of the effectiveness of the vaccination activities in meeting the disease-reduction objectives in the area
- commenting upon their performance in diagnosing and recording cases
- answering questions and helping them solve problems they have in collecting data
- congratulating them on doing a good job or encouraging them to do a better job

5.1 Reasons for providing feedback.

Providing feedback is essential to keep staff motivated to achieve high levels of immunization coverage and motivated to collect accurate and complete data on the occurrence of the target diseases. Your staff need to understand that the information they collect is important because:

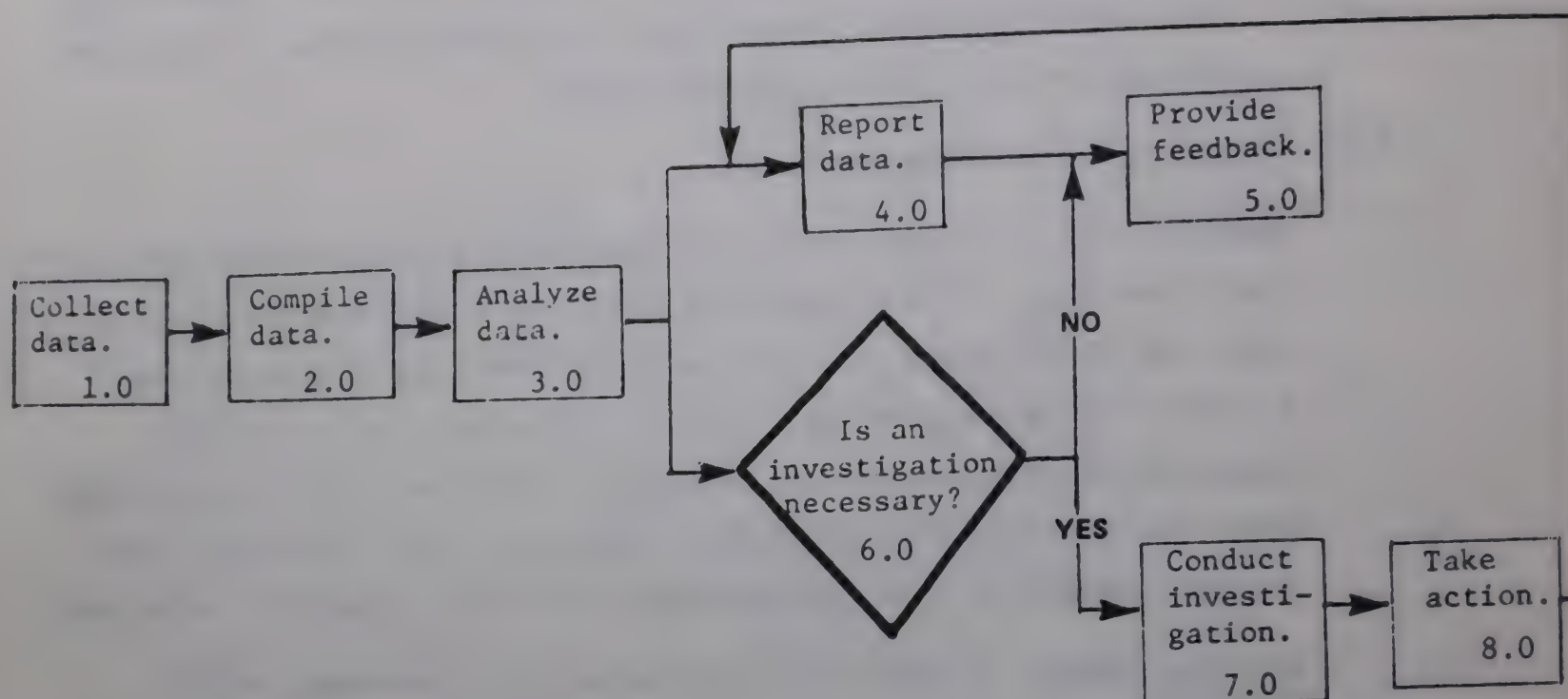
- you will analyze it in order to evaluate the effectiveness of the vaccination activities in your area, and

- your supervisor will analyze your reports and the reports from other health centres to evaluate the effectiveness of vaccination activities in the entire region.

5.2 Methods of providing feedback.

Feedback can be effectively provided during regularly-scheduled staff meetings. These meetings would be a good opportunity to tell the staff about the successes or problems health centres in other areas are having. You may also want to use these meetings as problem-solving sessions. If there are any problems with the vaccination activities, ask the staff what they think are the causes of the problems and get their ideas for solutions.

Another method of providing feedback is to encourage staff members to come to you for help whenever they have problems diagnosing cases, problems using the established recording procedures, or problems in immunizing children.



6.0 IS AN INVESTIGATION NECESSARY?

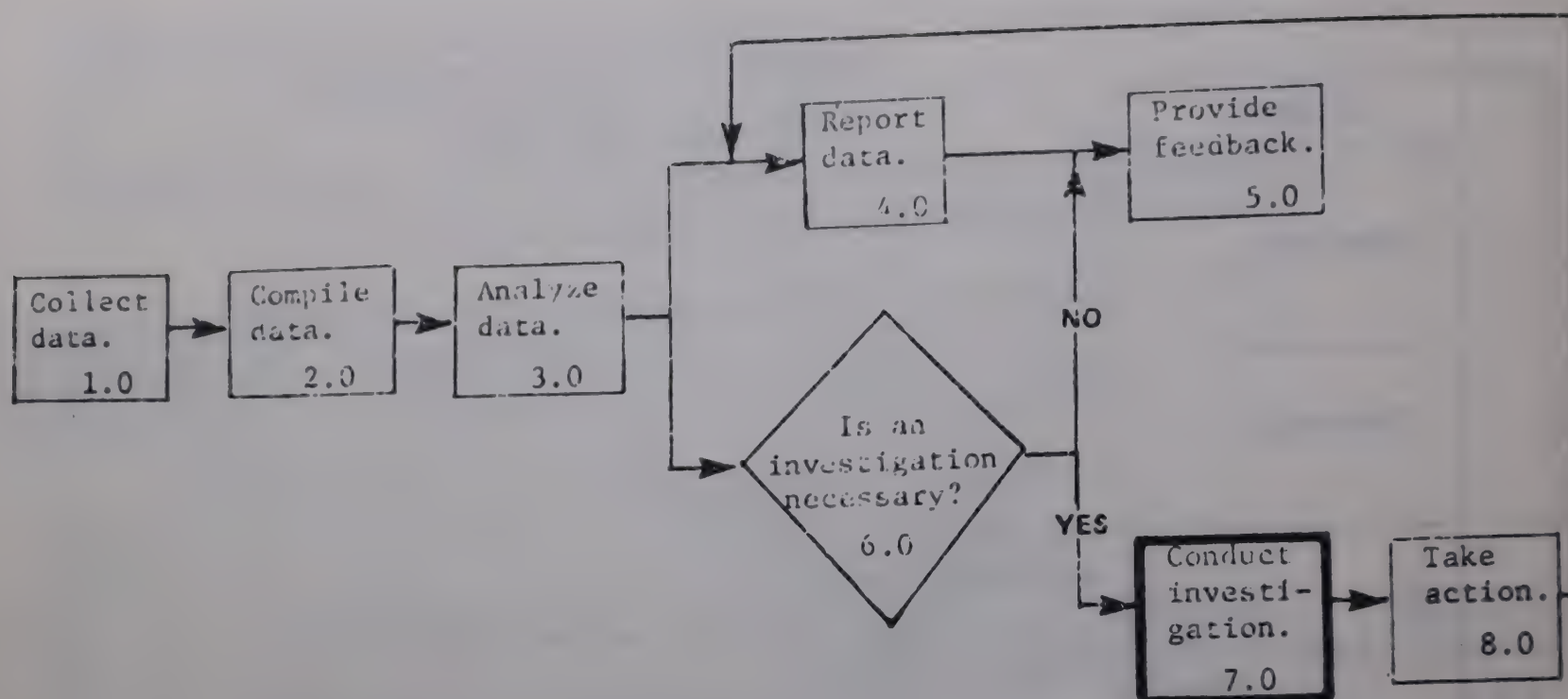
An investigation should be conducted if the surveillance data show the following:

1. The number of cases calls for an investigation. The number of cases which must occur before an investigation is necessary is not the same for all the target diseases or in all areas. You will have to adapt the guidelines shown in the chart in Figure 14 on page 37 to suit your area.
2. Many cases are occurring in fully-vaccinated children. Remember that a very small percentage of children who are fully vaccinated at the proper age with potent vaccine do not respond to the vaccine, so they remain susceptible to the disease. Therefore, a small number of cases in fully-vaccinated children does not require an investigation. If, however, more than 5% of the children who were fully vaccinated get the disease, then an investigation should be conducted.

NOTE: Give priority to investigation of outbreaks in vaccinated children. These may reveal a weakness in your immunization programme.

DISEASE	CONDUCT AN INVESTIGATION WHEN SURVEILLANCE DATA SHOW:
Measles	Several cases in vaccinated children Outbreaks in areas thought to be well-covered
Pertussis	Several cases in vaccinated children Outbreaks in areas thought to be well-covered
Tetanus	A single case: <ul style="list-style-type: none"> - in a child born to a mother who was fully vaccinated - in a fully-vaccinated mother who has just delivered a child Several cases: <ul style="list-style-type: none"> - in children born to mothers who were <u>not</u> fully vaccinated - in mothers who were <u>not</u> fully vaccinated who have just delivered children
Polio	Several cases in vaccinated children
Diphtheria	A single confirmed case
Tuberculosis	Outbreaks in vaccinated children

Figure 14.



7.0 CONDUCT INVESTIGATION.

Your action depends upon the reason for the investigation. There will be three major reasons for conducting an investigation: more cases than you expect, cases occurring in vaccinated persons, and fewer cases than you expect.

7.1 More cases than you expect.

Check the reports of the immunizations performed in the population served by the health centre. If they suggest that the immunization coverage is low, the increase in cases should not surprise you! Warn the health staff and the community of the problem and make all efforts to improve coverage.

If the immunization reports suggest high coverage, this may indicate a problem with the vaccine, but a visit to the area from which the cases are being reported will be necessary to be sure. During the visit, check the immunization cards of all the children you find to see whether coverage has been high or low.

Visit as many cases as possible and from questions and examination decide whether you think the original diagnosis was correct. Then check carefully to determine whether or not the case had been

vaccinated. Count as "vaccinated cases" only those who were given the appropriate number of doses and had been vaccinated at least two weeks before they became ill, since many of the vaccines will take this long before they protect the child.

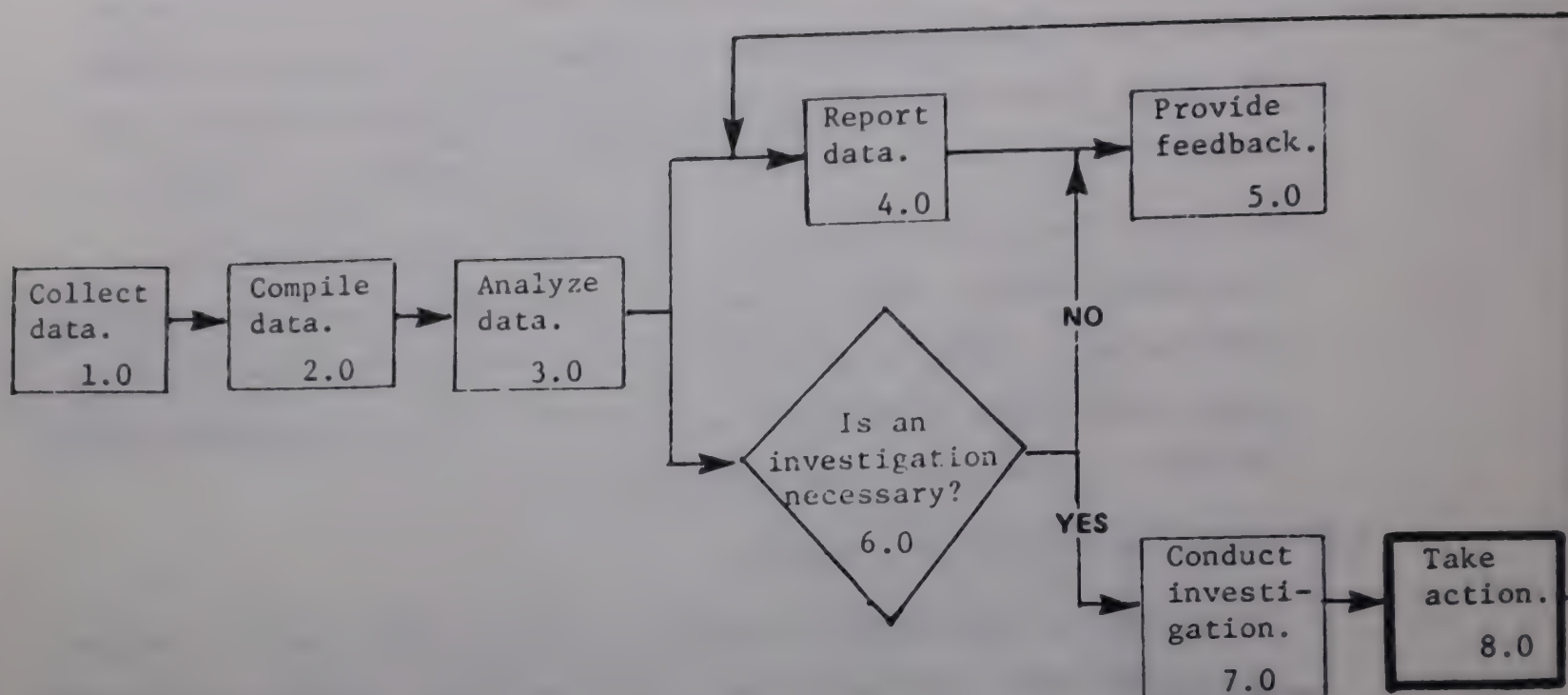
If more than 5% of the cases were fully vaccinated at least two weeks before they became ill, the vaccine used was probably not potent. This is an emergency for your programme! Contact your supervisor as quickly as you can to make a decision whether or not to continue using this vaccine.

7.2 Cases in vaccinated persons.

First try to confirm the diagnosis of the cases and to confirm that they were vaccinated at least two weeks before they became ill. If there still seems to be a problem, visit the area(s) from which the cases are being reported. During the visit, look for all children who had the disease at about the same time as the cases who were reported. Confirm the vaccination history in each case you find. You will probably find several cases which have not been reported. If more than 5% of all the cases you find were vaccinated at least two weeks before they became ill, the vaccine used was probably not potent. This is an emergency for your programme! Contact your supervisor as quickly as you can to make a decision whether or not to continue using this vaccine.

7.3 Fewer cases than you expect.

First check with the other staff of the health centre to see if there is some good explanation for a sudden decrease in the number of reported cases. Is a new staff member misdiagnosing or failing to report? Has vaccination coverage recently been increased? Are parents avoiding bringing cases to the health centre because staff have been rude, or because a traditional healer has convinced them to stay away? You may not be able to find an answer which satisfies you, but you should always look for one. Fewer cases can be just as much of a danger signal as more cases!



8.0 TAKE ACTION.

The health of the people in the area served by your health centre is your responsibility. Therefore, you will want to take action to correct any problems your investigation uncovers.

The following chart (Figure 15) suggests some solutions for common findings of investigations.

FINDINGS OF INVESTIGATION	POSSIBLE SOLUTIONS
1. The number of cases of neo-natal tetanus is increasing in infants of unvaccinated mothers.	1. Find out who birth attendant was and provide training in the proper techniques of cutting the umbilical cord. Determine why coverage is low and correct the problem.
2. A large number of cases of pertussis is occurring in children who should have been immunized by the programme but who were not.	2. Determine why the children were not immunized. There are many possibilities: lack of public participation, vaccination sessions not being held when scheduled, etc. Correct problem causing low coverage.
3. A large number of measles cases is occurring in children who were vaccinated before 9 months of age.	3. Provide health workers with a list showing ages at which a child should receive different vaccines. Stress the importance of vaccinating at the proper age.

Figure 15.

Exercise E

Questions 1-4 deal with findings of investigations. For these questions you are given information about the number of cases of diseases reported at various health centres, vaccination coverage, and other factors. The information may be incomplete, but based on the information provided, decide what action you would take to correct the situation. Write your answers in the spaces provided.

1. A large number of pertussis cases is reported from communities with a vaccination coverage of 70% for one dose of DPT, 50% for two doses, and 20% for three doses. How would you investigate the problem?

What would you do? _____

2. A large increase in pertussis cases is reported in a community with at least 80% coverage with three doses of DPT by the time children reach 15 months of age. Cases are occurring in vaccinated children. How would you investigate the problem? What would you do? _____

3. An increase occurs in cases of neonatal tetanus reported from one rural health post. In your investigation, you find that midwives are using properly sterilized knives for cutting the umbilical cord,

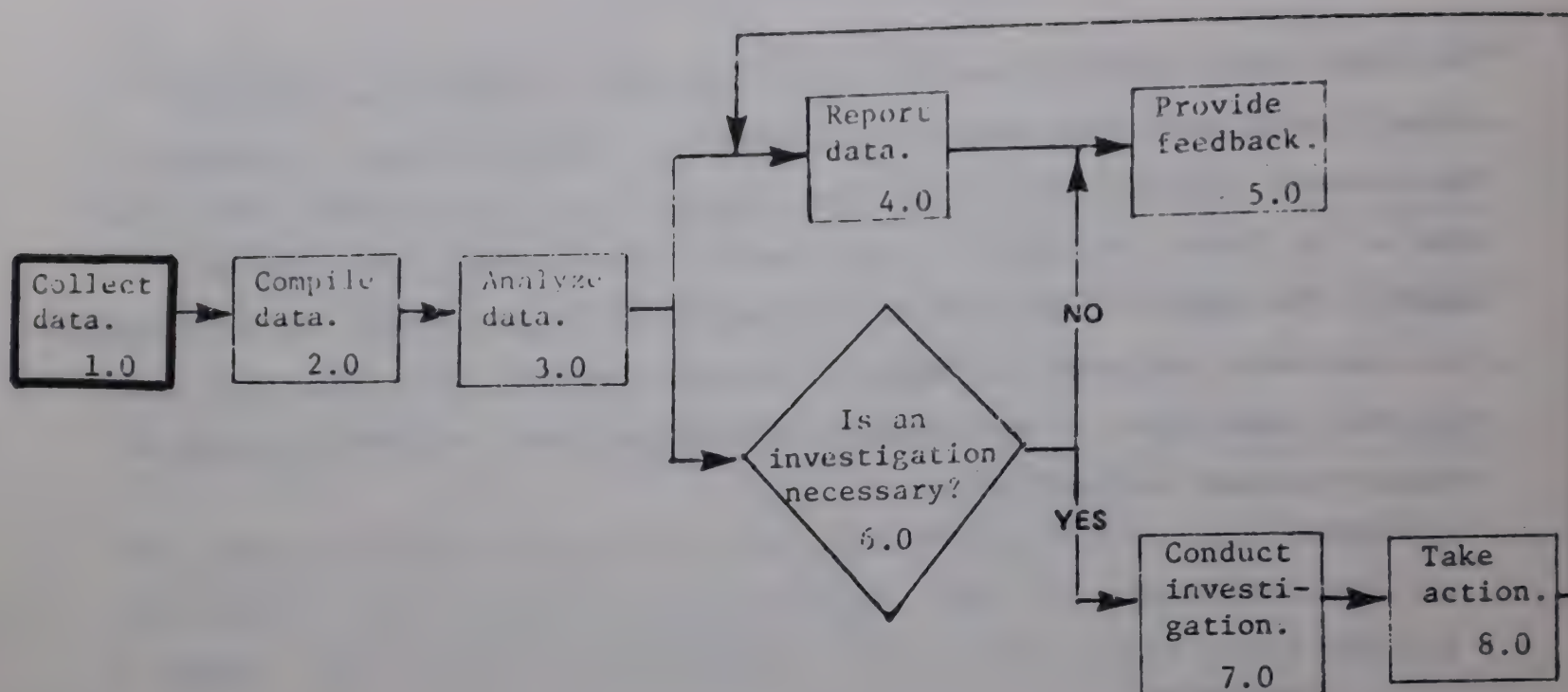
but that cow dung is placed on the cord afterward. How would you investigate the problem? What would you do? _____

4. The number of reported measles cases increases greatly in a community where 80% of the children are vaccinated. Most are vaccinated at age 6 months. How would you investigate the problem? What would you do?

Discuss your answers with a course manager when you have completed this exercise.

PART II: REGION

The basic steps and responsibilities involved in conducting disease surveillance have been described in PART I: HEALTH CENTRE. Although the disease surveillance activities conducted at the regional level are similar to those conducted at the health centre level, they are not exactly the same. This part of the module will not repeat the information that has been included in PART I. It will describe the tasks that the regional supervisor of vaccination activities must perform in order to conduct disease surveillance.



1.0 COLLECT DATA.

Data collected at the regional level are used

- to decide at the regional level whether changes in the programme are necessary.
- to decide at the national level whether changes in the programme are necessary.

Although the primary purpose of gathering surveillance data at the regional level is for use at the regional level, it is also important that data from each region be reported to the national office. The national supervisor can then analyze the data from the entire country and inform you of situations which could affect the vaccination activities in your region.

The procedures you will follow to collect and report surveillance data will probably be determined at the national level. These will include:

- which information to gather,
- how often to compile the information,
- how often to report the information, and
- which forms and format to use to report the information.

These procedures may already be in use, and you may already be familiar with them. Whether you are asked to follow existing rules or new ones, be sure you understand and follow them properly.

1.1 Receive surveillance reports.

The supervisor at each health centre in your region is responsible for the collection of surveillance data in his area. At the beginning of each reporting period, he should send you his surveillance report for the previous reporting period. The minimum amount of information you should receive from each health centre is:

- the number of cases of each of the target diseases counted during the reporting period, and
- the vaccination status of each case.

Figure 16 on page 46 shows a sample monthly surveillance report form which provides spaces for all of the essential data to be reported. If the health care system in your country requires that more detailed information be collected, the reports you receive may be more detailed and may include other information, such as the age and sex of the cases.

In order to monitor the receipt of surveillance reports, you can keep a chart on the wall in your office to show the dates the reports are received. The chart might look like the sample chart (Figure 17) on page 47.

When you receive a regular monthly surveillance report from a reporting unit, record the date of receipt in the appropriate column on the chart.

By maintaining this chart, you can quickly review which health centres and hospitals are reporting promptly. This can also help you to follow up and ask those units which do not report on time to submit their reports immediately.

MONTHLY SURVEILLANCE REPORT				
Health Centre: _____			Year: _____	
Region: _____			Month: _____	
Diseases	Vaccinated	Unvaccinated	Vaccination Status Unknown	Total
Measles				
Pertussis				
Diphtheria				
Neonatal Tetanus				
Other Tetanus				
Poliomyelitis				
Tuberculosis				
Submitted by: _____ <div style="text-align: center;">Supervisor of Vaccination Activities</div> Date: _____ Received by: _____ Date: _____				

Figure 16.

Your goal is to achieve regular surveillance reporting from all areas in your region so that you can monitor the effectiveness of the immunization activities. When immunization activities are first started or increased in an area or region, the surveillance reports may not completely and accurately reflect the actual number of cases for the following reasons:

- Not all cases come to a health facility.
- Not all cases are diagnosed correctly.
- Only some health facilities report.
- The health facilities that report do not report all the time.

DATES SURVEILLANCE REPORTS RECEIVED													
Region: <u>One</u>										Year: <u>1979</u>			
REPORTING UNITS					Date Report Received for the Month of:								
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.	
Health Centre A	5/2	6/3	4/4	3/5	5/6	3/7	3/8	6/9	4/10	6/11	5/12	4/1	
Health Centre B		13/3	9/4	6/6	6/6	5/7		10/9		9/11	13/12	16/1	
Health Centre C	8/2	9/3	4/4	8/5	7/6	4/7	22/8	5/9	8/10	9/11	5/12	4/1	
Health Centre D	14/2	8/3	8/6	15/5	8/6	9/7		14/9		13/11	7/12	8/1	
Health Centre E	6/2	6/3	11/4	10/5	5/6	6/7	7/8	10/9	15/10	9/11	6/12	7/1	
Health Centre F	7/3	6/4	9/5	9/5	20/9	20/9	20/9	20/9		27/12	27/12	27/12	
Hospital A	9/2	7/3	16/4	8/5	14/6	9/7	6/8	11/9	12/10	13/11	12/12	7/1	

Figure 17.

You can help increase the reliability and accuracy of the surveillance reporting system in your region by encouraging health centre staff to be careful in their work, to submit their reports on time, and to let you know when they need help. Tell the local supervisors how their reports are being used, and how immunization activities are affected by the reports. Explain to each supervisor that you will analyze the information from his area, compare it to information from the other areas in the region, and determine if situations exist anywhere in the region which are preventing disease-reduction objectives from being met. Emphasize that the data will be used to help the health centres achieve their goals, so it is very important that each supervisor submit his report promptly after the end of each reporting period. Explain that it is important to submit a report after each reporting period, even if there are no cases to report. If the local supervisor does not submit a report showing no cases, you cannot determine whether no cases were recorded in his area or whether the report is merely delayed.

1.2 Select sentinel sites.

Even though you are working to improve surveillance reports from all the health centres in your region, it may be useful to select a few centres whose reports are particularly dependable and use these centres as indicators of what is happening in the region. Such centres are called "sentinel sites." They are like sentinels, or watchmen, who provide a warning when a problem may be approaching. For example, if a sentinel site reports a large increase in cases of pertussis, there are probably increases in cases in other areas also.

The selection of sentinel sites involves more than a simple identification of the sites that are currently submitting data. Because reporting accuracy and reliability will vary, you will need to look carefully at all reporting sites, at the personnel

at these sites, and at the characteristics of the population of the areas served by the sites in order to determine which reporting sites could provide the most useful surveillance information.

Remember that although accuracy and regularity of reporting are of most importance, sentinel sites should also be chosen so as to be as representative as possible of the general population of the region.

(1) Personnel

In order to select sentinel sites, examine the data received in previous years and choose those health centres which have the best past reporting performance. The quality of reporting depends upon the interest of the individuals completing the forms. The information will be accurate only if the health centre personnel carefully record and report all the cases of the target diseases they see at the centre.

(2) Geographic area

If possible, sentinel sites should be well distributed geographically. The information you receive may not accurately reflect regional trends if it comes from only a few of the districts or primarily from major cities or towns.

(3) Population

While it would be nice if sentinel sites were perfectly representative of the general population, this is never possible. You should know the characteristics of the population around each sentinel site, however, so you can know how to interpret the reports. For example, if a sentinel site attracts rural people, an increase in cases of a disease from this site may suggest looking at other rural areas for increases in cases.

As already stated, your primary goal is to identify centres which will give you dependable information. Although the information collected from these sentinel reporting sites will not permit an estimate of the overall number of cases, it should give you a better indication of disease trends than will information from centres which do not report dependably.

CAUTION: In your analysis of data, remember that sentinel sites may be better than other health centres in vaccinating as well as in reporting, so the data may not accurately reflect the trends in the number of cases in other areas in your region.

Your continuing efforts to ensure that all health centres collect surveillance data properly and submit reports promptly will eventually produce information that more accurately shows the actual number of cases of the diseases throughout your region.

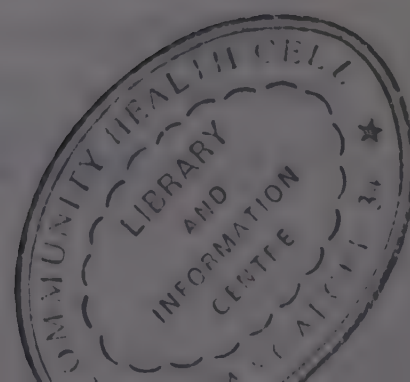
Exercise F

Instructions: Read the following paragraphs, then examine Figures 18 through 20 on pages 52 - 53. After you have examined the figures, answer questions 1 through 3, which follow Figure 20. Use the worksheets provided on pages 54 and 55 to do your work.

Assume that you have just been assigned as Regional Supervisor of the expanded immunization programme in Region A. You are responsible for organizing and supervising disease control activities in your region. One of your duties is to monitor the number of cases of the target diseases which occur so that you can evaluate the effectiveness of the vaccination activities which began in the region eight years ago.

There are eight health centres and one hospital in the region. At the beginning of each month, each of these health facilities should submit a surveillance report showing the number of cases of the target diseases which occurred in its area during the previous month. On the first day of your new job at region headquarters, you decide to review the surveillance data which is available for the past three calendar years, 1976-1978. Since measles is the disease for which the largest amount of data are usually available, you decide to concentrate on the measles data.

Figures 18 through 20 show the number of cases of measles reported per month by each of the health facilities from 1976 to 1978.



NUMBER OF MEASLES CASES REPORTED, REGION A

1976

	J	F	M	A	M	J	J	A	S	O	N	D
Hospital A	42	67	85	...*	...	...	...	194	75	6	8	11
Health Centre 1	23	35	38	47	49	26	13	3	5	7	11	12
Health Centre 2	17	23	...	...	8	95	...	...	70	10	...	...
Health Centre 3	7	11	...	...	...	61	...	...	4	8	...	42
Health Centre 4	5	...	14	20	...	...	42	...	0	2	5	...
Health Centre 5	12	19	25	37	32	16	9	4	3	4	7	10
Health Centre 6	42	...	...	...	...	...	...	97	...	...	...	...
Health Centre 7	8	11	17	...	32	13	18	17	21	5	4	7
Health Centre 8	...	...	...	...	...	...	...	...	...	...	234	...
TOTAL	156	166	179	104	121	211	82	315	178	42	269	82

Figure 18.

1977

	J	F	M	A	M	J	J	A	S	O	N	D
Hospital A	27	34	58	...	...	106	12	7	6	...	9	...
Health Centre 1	15	18	24	29	32	16	8	4	0	3	5	9
Health Centre 2	...	15	...	19	...	30	7	2	1	4	7	...
Health Centre 3	...	15	17	...	...	...	25	...	6	1	...	5
Health Centre 4	7	11	...	...	...	50	...	9	...	2	2	4
Health Centre 5	11	16	16	17	18	5	8	2	0	1	2	5
Health Centre 6	27	...	...	...	...	...	...	103	...	...	...	4
Health Centre 7	...	8	11	16	15	10	...	6	0	1	1	3
Health Centre 8	5	...	...	...	...	...	156	...	...	20	...	...
TOTAL	92	117	126	81	65	217	216	133	13	32	26	30

Figure 19.

* "... " means no report was received for the reporting period.

1978

	J	F	M	A	M	J	J	A	S	O	N	D
Hospital A	17	24	31	...	...	55	8	6	5	9	15	...
Health Centre 1	11	10	19	21	25	12	5	1	0	4	6	8
Health Centre 2	15	10	17	...	...	...	50	2	...	5	9	10
Health Centre 3	9	11	15	...	25	...	5	0	...	3	5	7
Health Centre 4	...	15	...	20	...	...	...	15	1	3	5	6
Health Centre 5	7	8	13	15	19	7	3	0	2	5	8	9
Health Centre 6	...	38	...	...	...	...	98	...	...	...	68	...
Health Centre 7	5	...	...	11	...	6	...	...	1	3	4	7
Health Centre 8	46	...	...	...	...	...	...	117	...	...	...	...
TOTAL	110	116	95	67	69	80	169	141	9	32	120	47

Figure 20.

1. a. Prepare a disease chart or graph for the number of cases of measles reported per month in Region A from 1976 through 1978.
- b. What pattern emerges for the region?
2. a. Determine which reporting units to use as sentinel sites. For this exercise, choose as sentinel sites those reporting units which have reported at least 75% of the time (i.e., those that have submitted at least 27 monthly reports during the three-year period).
- b. Prepare a disease chart or graph for the number of cases of measles reported per month by the sentinel sites in Region A from 1976 through 1978.
- c. What pattern emerges for the region if you use only the reports from the sentinel sites?
3. Based upon your knowledge of the seasonal pattern of occurrence of measles (see PART I, Step 3.3, on page 25), which chart or graph more accurately reflects the measles problem in the region? Why?

Worksheet for Exercise F

1. a.

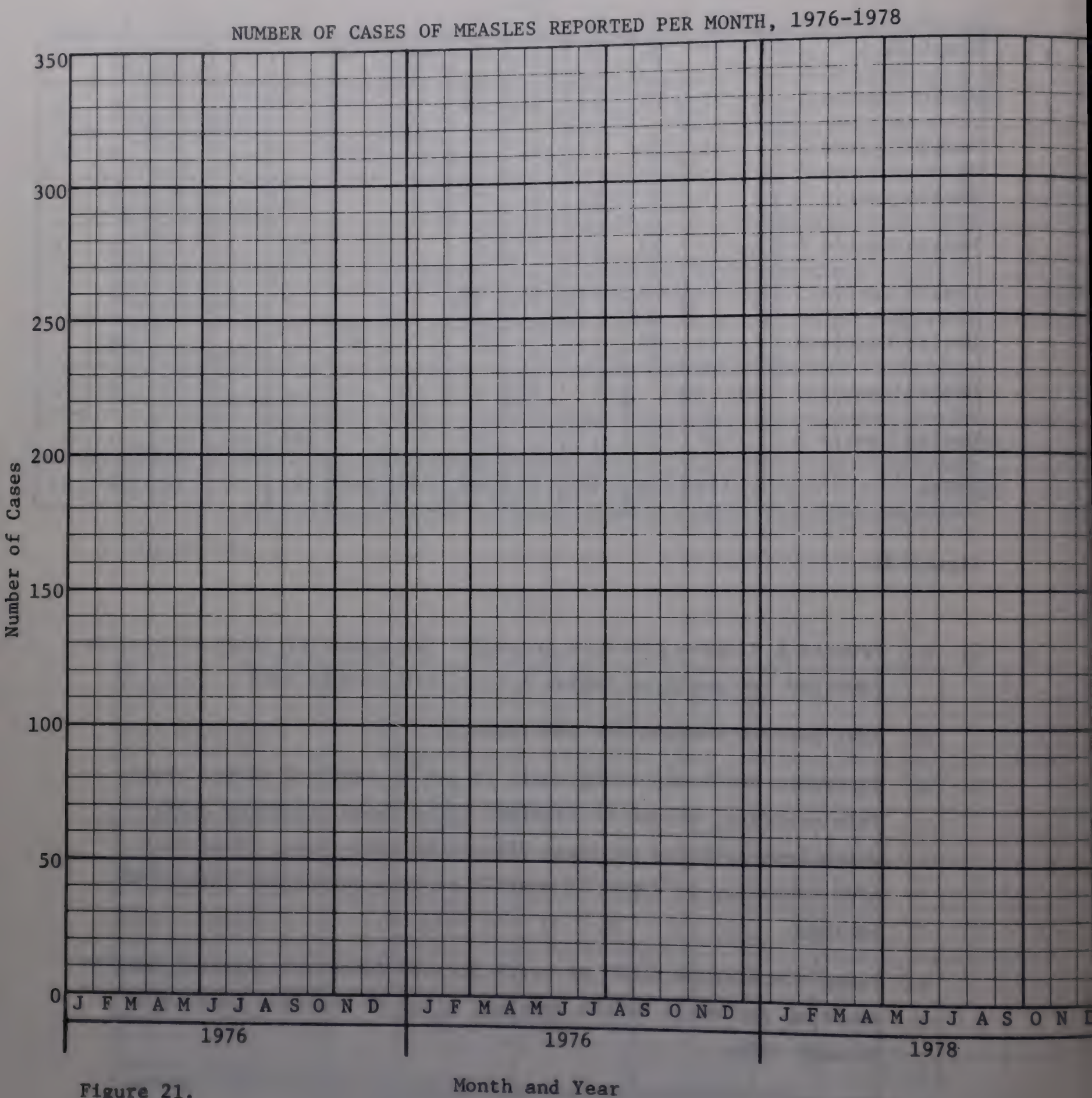


Figure 21.

b.

2. a.

b.

NUMBER OF CASES OF MEASLES REPORTED PER MONTH
BY SENTINEL SITES, 1976-1978

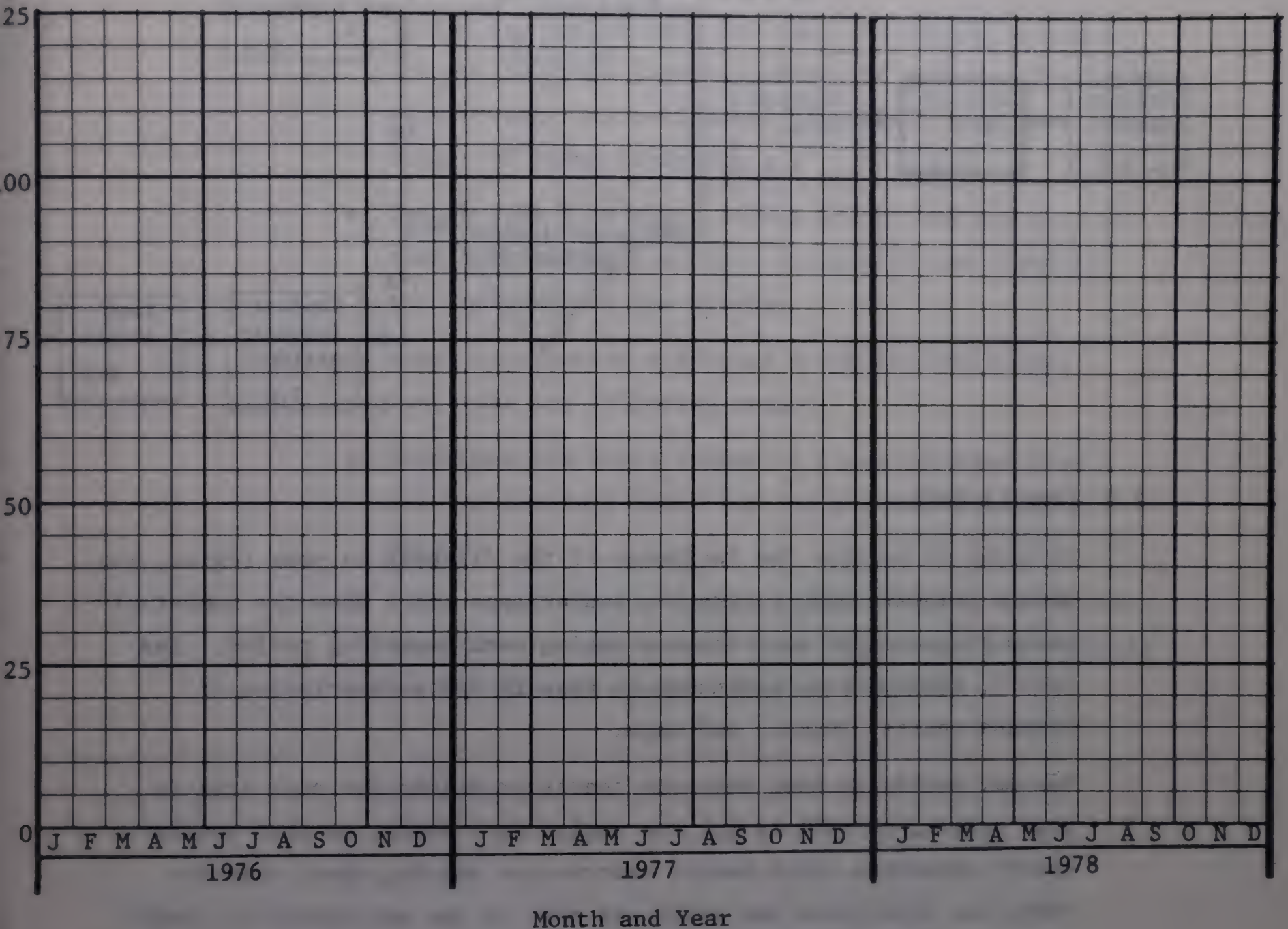
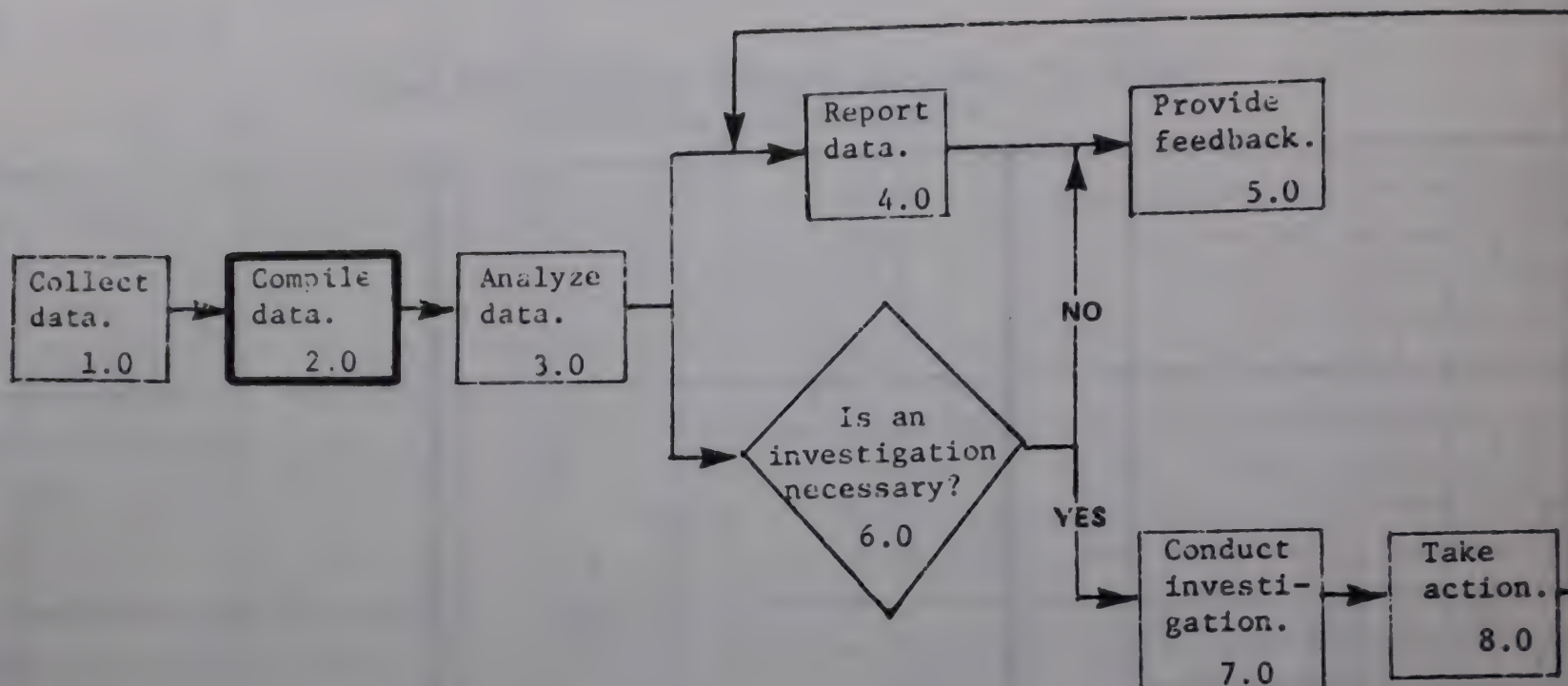


Figure 22.

c.

3.

Discuss your answers with a course manager when you have completed this exercise.



2.0 COMPILE DATA.

In order to monitor the incidence of the diseases in your region, you should maintain charts, graphs, and/or maps which show the number of cases diagnosed of each disease during each reporting period. See PART I, Section 2.0, beginning on page 10 for a description of disease charts, graphs, and maps.

You may decide to keep separate charts or graphs for each area in your region, as well as for the region as a whole, so that you can easily determine which health centres are meeting their disease-reduction objectives and which are not; or you may decide to simply record the numbers of cases for each centre and make charts or graphs for the sentinel sites only.

2.1 Disease charts.

In order to maintain a disease chart for the entire region, take the following steps:

- Determine the total number of cases reported from all the sentinel sites for the previous reporting period.
- Draw a bar representing the total number of cases in the appropriate space.

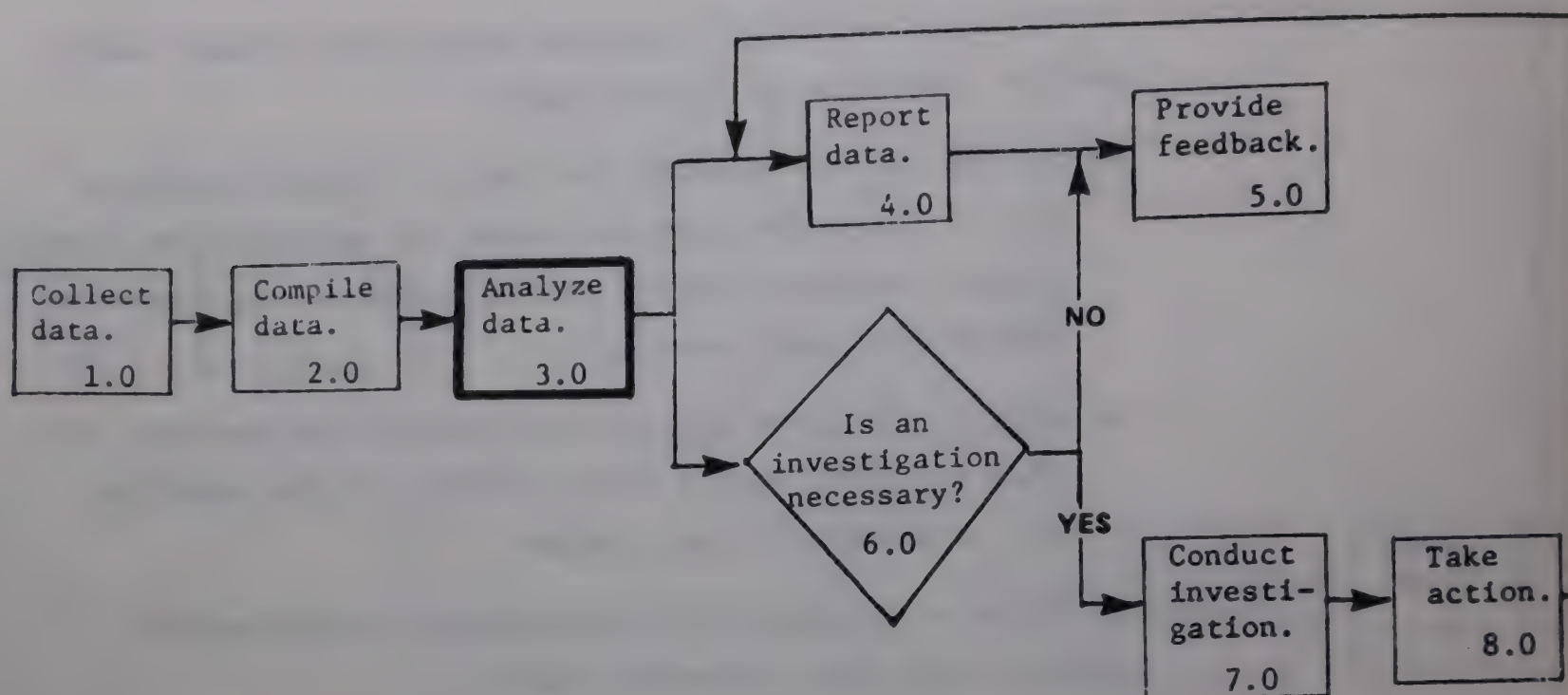
2.2 Disease graphs.

2.2.1 In order to maintain a disease graph for a single health centre, take the following steps:

- On the day you receive the centre's report, place a dot on the graph directly above the mark for the appropriate reporting period and directly across from the number of cases reported.
- Draw a line from the previous dot to the new one, so that you will have a clear picture of the trend in the incidence of the disease.

2.2.2 In order to maintain a disease graph for the entire region, take the following steps:

- Determine the total number of cases reported from all the sentinel sites for the previous reporting period.
- Place a dot (on the region graph) directly above the mark for the appropriate reporting period and directly across from the number of cases reported.



3.0 ANALYZE DATA.

See PART I, Section 3.0, on pages 24-28. Reported cases are usually only a small part of the cases which are actually occurring. It is quite simple to estimate the real number of cases of measles and pertussis in areas which do not have immunization programmes, because most children will get these diseases. They are such universal health problems that they can be assumed to be occurring, even though there may be no reports of cases.

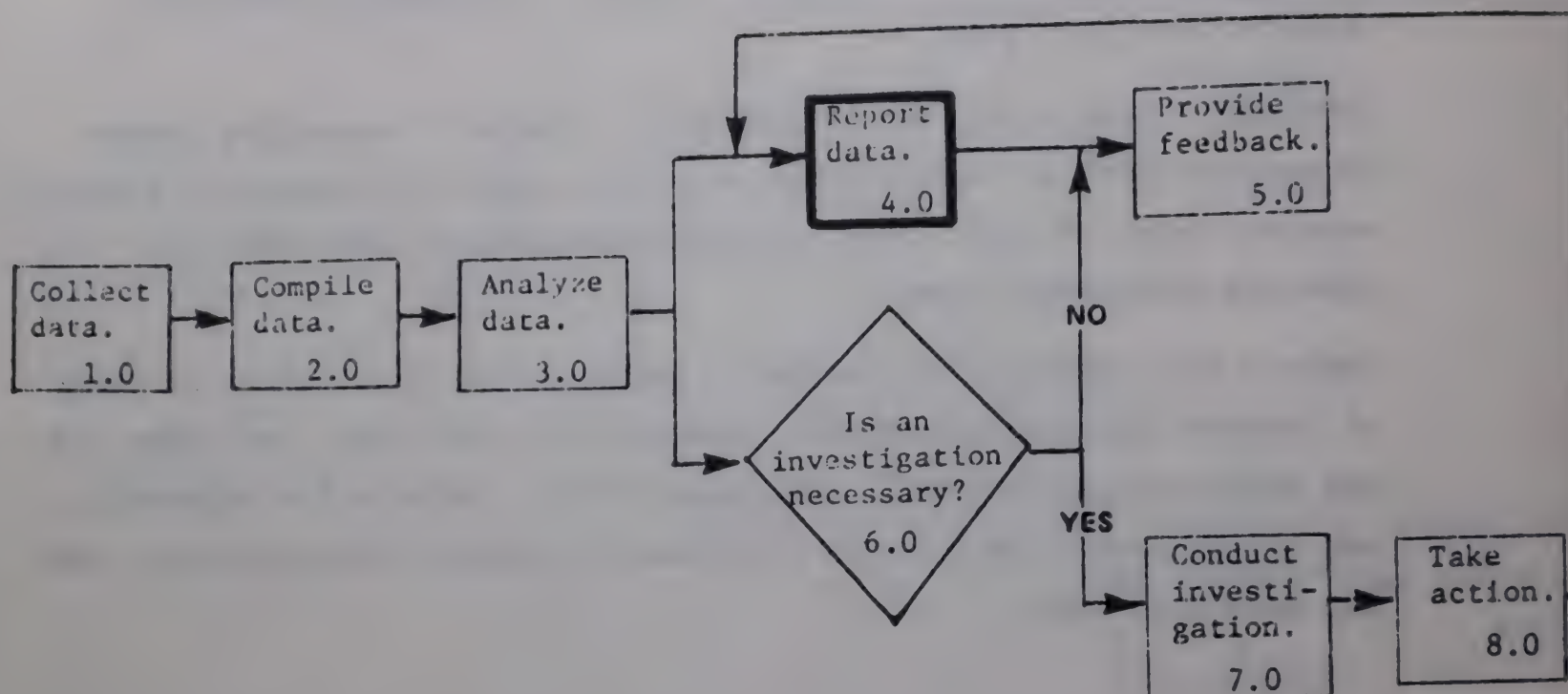
For measles over a 5- to 10-year period, a "perfect" reporting system would show an average number of cases per year which is about the same as the number of children born each year. Of course, some children may die before getting measles, and in areas with high infant mortality rates, the number of cases can be better estimated by subtracting 10% from the number of newborns. An average over several years is needed because epidemics will cause large increases in cases one year, but smaller number of cases will occur the next year.

For pertussis, only about one-half the children who are infected will have typical symptoms which a health worker would recognize, and some 20% of children may not get infected. Over a 5- to 10-year period

in a "perfect" reporting system, the average number of cases reported per year will be about the same as 40% of the average number of children born per year.

Question: Over a 10-year period with a "perfect" reporting system in an area without immunization services, would the number of reported measles cases be more, less, or about the same as the number of reported pertussis cases?

Surveys will probably be needed to estimate the true number of cases of tetanus and poliomyelitis in newborns in your area, and these are not difficult to perform. See pages 68-70. Surveys for diphtheria and tuberculosis can also be performed in special circumstances, but are more difficult.



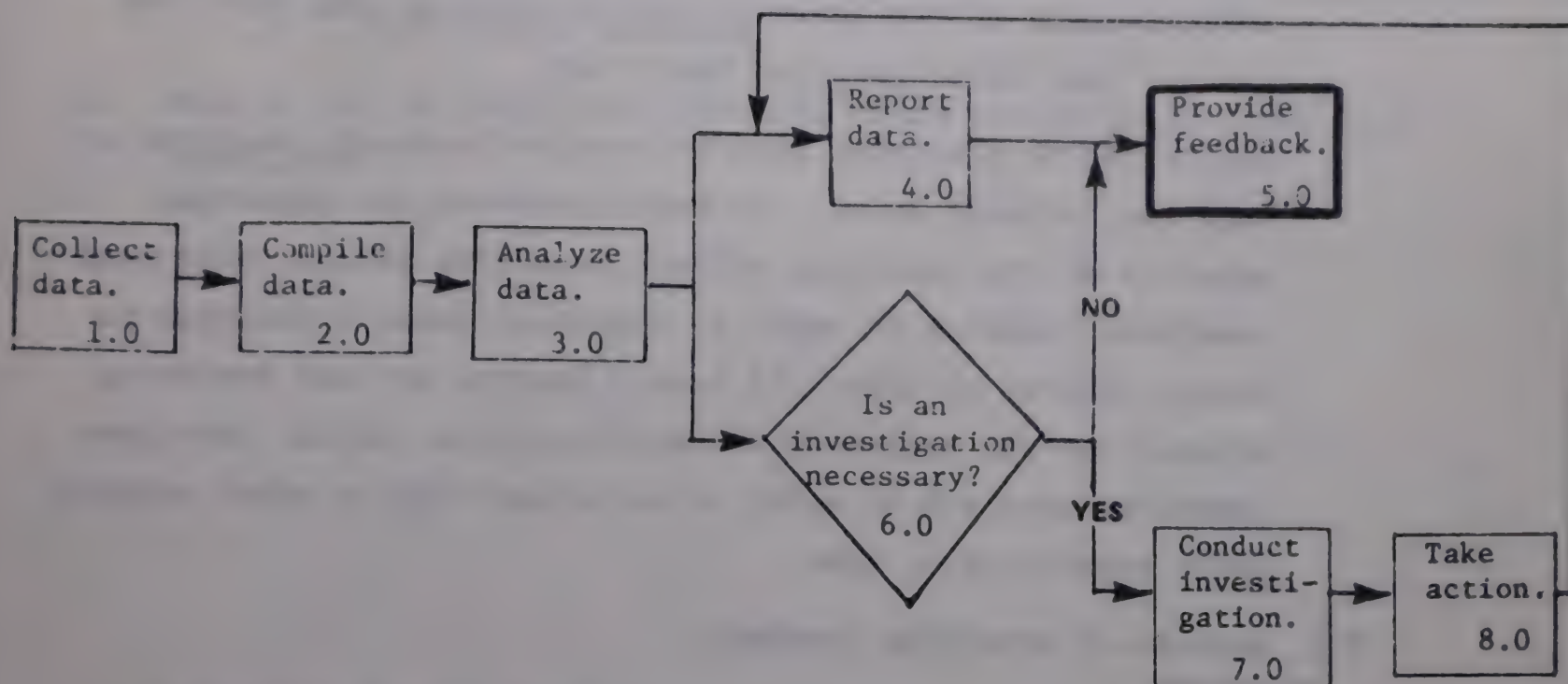
4.0 REPORT DATA.

After you have analyzed the data for the previous reporting period, prepare the regular surveillance report and send it to the national supervisor.

It is essential that the report be sent to him promptly after the end of each reporting period so that he can determine if action at his level is required.

The reports you will use and the times for submitting them will probably be established at the national level of the immunization programme.

A sample Monthly Surveillance Form was shown in Figure 16 on page 46.



5.0 PROVIDE FEEDBACK.

The term "feedback" refers to:

- commenting to the local supervisors of vaccination activities upon the promptness and accuracy of their surveillance reports
- informing them of the effectiveness of the vaccination activities in meeting the disease-reduction objectives in the region
- offering information which might be helpful to them in solving problems (for example, tell them how the staff at one health centre solved a common problem)
- congratulating them on doing a good job or encouraging them to do a better job

5.1 Reasons for providing feedback.

Providing feedback is essential to keep staff motivated to achieve high levels of immunization coverage and motivated to collect accurate and complete data on the occurrence of the target diseases. Health centre personnel need to see that

the information they report is important. They need to know that the reports are actually used in order to evaluate the effectiveness of the immunization activities, and that they are not just filed away and forgotten.

Health centre personnel need to receive feedback, positive or negative, without delay. If health centres are reporting promptly at the beginning of each reporting period, they need immediate feedback in order to encourage them to continue to submit reports on time. If health centres are not reporting promptly at the beginning of each reporting period, they need immediate feedback in order to encourage them to start sending their reports in on time.

5.2 Methods of providing feedback.

Feedback can be effectively provided by sending newsletters to the health centres in order to keep them informed about the region's progress in reducing the incidence of the target diseases.

If newsletters are to be sent to the health centres, ensure that they are not composed entirely of charts, graphs, and numbers, but that they contain stories about the immunization activities and matters of interest to the health centre personnel.

There is one great disadvantage to using newsletters: delay. Local supervisors and vaccination staff need to receive information immediately if good performance is to be rewarded and inadequate performance is to be improved. For this reason, in addition to newsletters, provide feedback through phone calls, personal letters, and staff meetings.

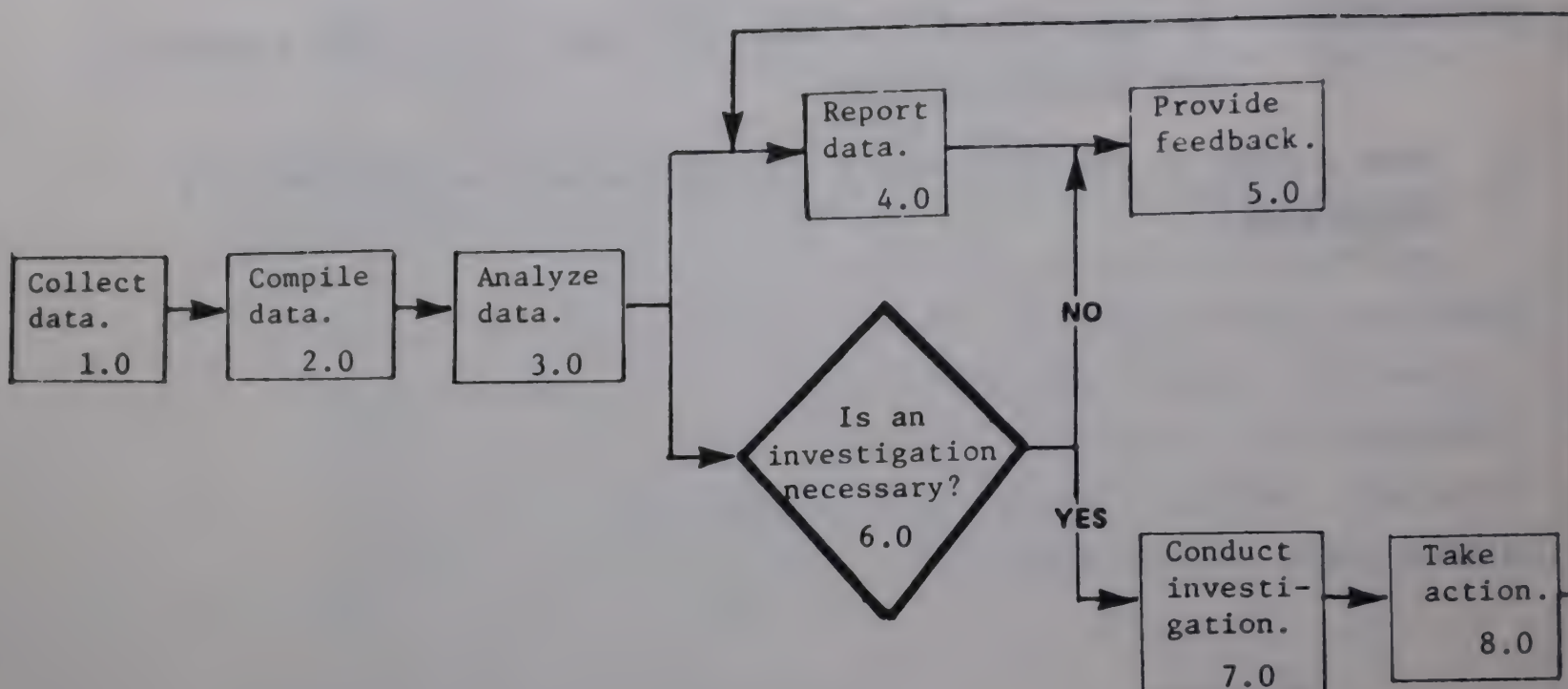
Exercise G

INSTRUCTIONS: Do steps 1 and 2 of this exercise. Write your answers in the spaces provided.

1. Make a list of the items which you think should be included in a newsletter.

2. Make a list of the kinds of people you think should receive the newsletter.

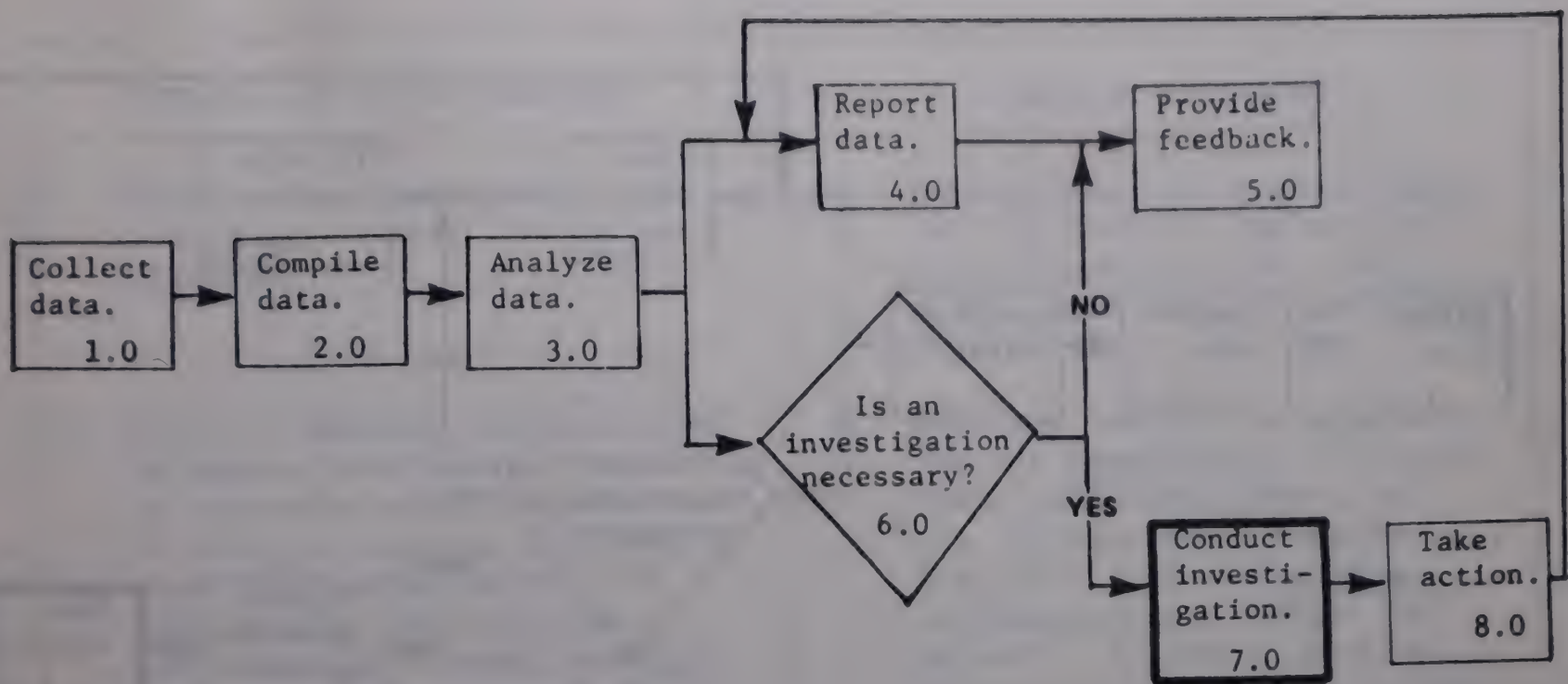
Discuss your answers with a course manager when you have completed this exercise.



6.0 IS AN INVESTIGATION NECESSARY?

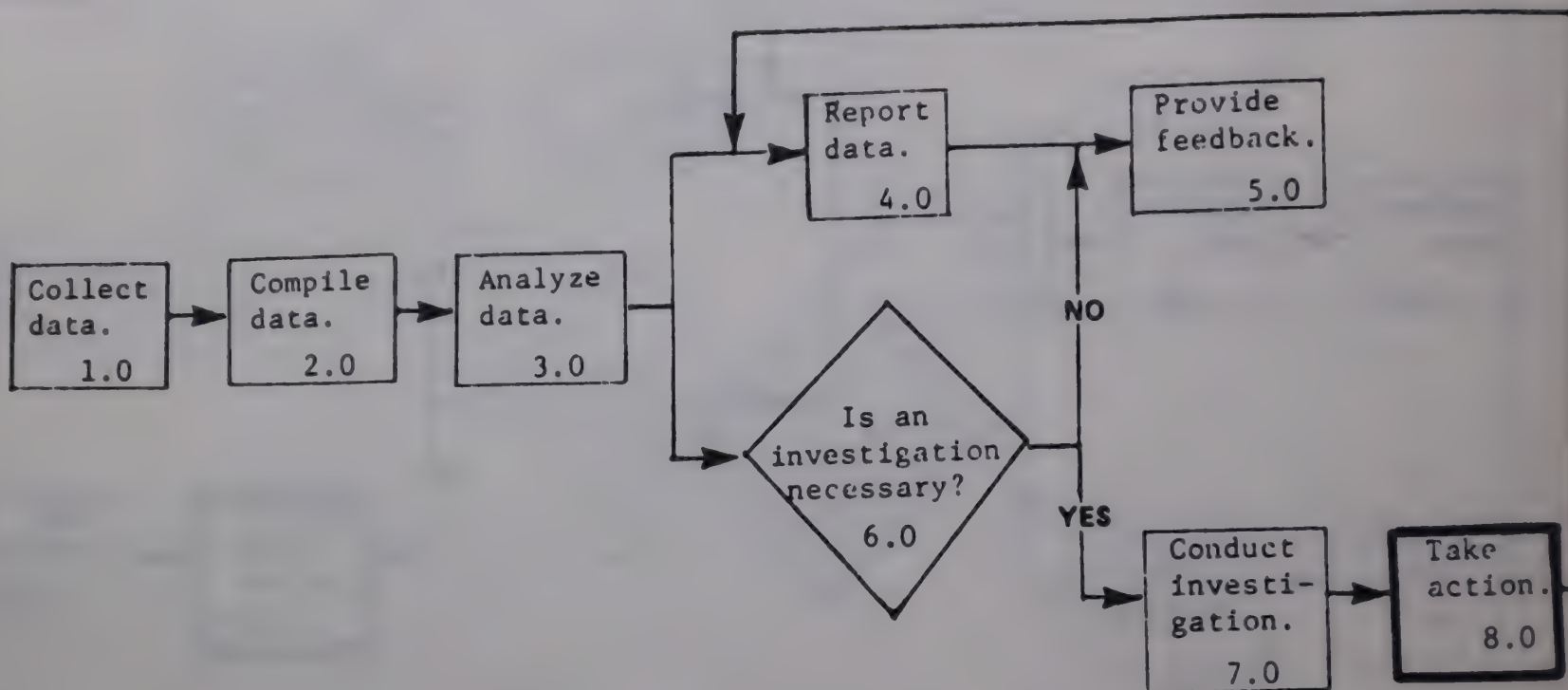
At the health centre level, certain criteria are used to determine when the regional level should be involved in an investigation. See PART I, Section 6.0, pages 36 - 37 for those criteria.

At the regional level, you should also compare the reported incidence between the reporting units and identify health centres which report a much higher or a much lower incidence than the other centres.



7.0 CONDUCT INVESTIGATION.

See PART I, Section 7.0, pages 38 - 39.



8.0 TAKE ACTION.

It is your responsibility to ensure that actions are taken to correct any problems your investigation uncovers. The chart on page 67 (Figure 23) suggests some solutions for common findings of investigations.

FINDINGS OF INVESTIGATION	POSSIBLE SOLUTIONS
<p>1. Health workers frequently not recording cases of the target diseases.</p>	<p>1. Explain what the surveillance data is used for and why it is so important that they record each case of the target diseases.</p>
<p>2. Cases of measles have occurred in properly-vaccinated children. On examining where the vaccine is being stored, it is found that the health centre refrigerator has not been defrosted for several weeks, and the temperature has risen above the acceptable level.</p>	<p>2. Stop the use of the impotent vaccine <u>immediately</u>. If more than 1,000 doses remain in the refrigerator, transfer them to a properly-working refrigerator and retest for potency. If fewer, destroy. Provide potent vaccine to the health centre, assuring first that the refrigerator has been defrosted and is working properly. Assign someone the task of checking the refrigerator and defrosting it regularly. Check to be sure the refrigerator is maintained properly.</p>
<p>3. Health workers leave vaccines sitting out on tables during the vaccination sessions and do not place them in ice water.</p>	<p>3. Explain to workers the importance of keeping the vaccines cold at all times.</p>

Figure 23.

ANNEX

OUTLINES FOR SPECIAL SURVEYS

SURVEY OUTLINE FOR TETANUS IN NEWBORNS

OBJECTIVE: To estimate the incidence of tetanus in newborns ("Tetanus Neonatorum" or "neonatal tetanus") in randomly selected areas. This estimate is to serve as base-line information for future evaluation of the result of tetanus vaccination of pregnant women.

ASSUMPTIONS:

Tetanus Neonatorum

1. Present incidence 5 per 1,000 live births
2. Every quarter of a year, 10 live births per 1,000 population
3. Highest number of births occur in the last quarter of each year

METHODOLOGY:

Target Population

200,000 population will be covered

Organization

Villages randomly selected; if the village is small, one worker may cover it; if the village is a large one, all team members will conduct the survey there. It is estimated that one team of five workers in two weeks' time can cover approximately 200,000 population.

Procedures

1. Team member arrives at a village/ward, visits every house there, inquires: has a child been born in this house or family during the last three months?
2. If yes, where is the child?
3. If the child has not survived, when did the child die? (at what age?)

4. If the child died in the first month of life:

(a) did the child drink milk for several days and then stop?

(Explanation: this differentiates neonatal tetanus from cerebral birth trauma, in which case the child is not able to drink milk from the beginning)

(b) were there any convulsions or spasms?

(c) did the child die of tetanus? (use the local name for this disease)

5. Do you know of any recent births in neighbouring houses? (If so, check whether these have been identified already.)

6. Reporting: results will be recorded, village-by-village:

Number of live births

Number of suspected Tetanus Neonatorum cases

SURVEY OUTLINE FOR RESIDUAL POLIO PARALYSIS

ORGANIZATION:

Before the survey starts, a meeting about the detailed methodology of the survey will be organized by the programme manager for epidemiologists, public health administrators, pediatricians, school health service representatives, and professors of social and preventive medicine.

A survey team consisting of nurses and headed by a medical officer visits randomly selected schools.

The team members examine the children first. Suspected cases of paralysis/paresis are re-examined by the team leader.

SUGGESTED METHODOLOGY:

- Team leader visits school one month prior to survey and explains study to principal
- Principal asks teachers to list names of all lame children in age group being surveyed
- Principal asks parents of lame children to come to school on day of survey
- Survey team goes to school
- Each child identified as lame by a teacher is asked to walk to confirm that he is lame
- Child is seated; examiner moves child's normal leg and affected leg to determine muscle tone (tightness) in each
- Examiner feels both legs to determine muscle mass (size) in each (may also take calf and thigh measurements)
- Examiner sticks affected leg with sharp and dull ends of a pin to see if child can tell difference
- Examiner asks parents child's age at onset of paralysis and to describe nature of onset (acute, gradual)

GLOSSARY

base-line data - information about conditions which existed before the present time.

compile - to gather information from several sources and organize it into reports, charts, or graphs.

disease surveillance - the collection of information about the number of cases of the target diseases, and the use of that information to evaluate the effectiveness of the vaccination activities and then to take action to correct any problems which are preventing disease-reduction objectives from being met.

epidemic - the occurrence in a community or region of many more cases of an illness than usually occur there.

expected incidence - the number of new cases of a disease expected to occur in an area during a specified period of time.

feedback - supervisors informing workers:

- how well they are performing their tasks
- specific actions they should take to improve their performance, if they need to
- how successful they have been in meeting their objectives
- congratulate them on doing well or encourage them to do better.

incidence - the number of new cases of a disease in a defined population during a specified period of time.

monitor - to watch, observe, or check in order to control.

multi-dose vaccination - a vaccination which a person must receive more than one time in order to be protected from the disease (e.g., diphtheria, tetanus, pertussis, and poliomyelitis).

neonatal tetanus - tetanus of newborn infants, usually due to infection of the umbilicus.

prompt - at once; without delay

range of number of cases - the lowest and highest numbers that usually occur of cases of a disease. (For example, if the range of number of measles cases that usually occurs in April is 30 to 50, then the number that actually occurs in April this year will probably be between 30 and 50.)

reporting period - a specified period of time for which you collect surveillance data (for example, one week, two weeks, one month, etc.).

seasonal pattern - the occurrence of a disease in a pattern so that more cases of it always occur in one season than in any other season of the year.

sentinel site - a reporting site that regularly submits accurate surveillance reports.

sign - evidence of disease found by the examiner.

susceptible - likely to become ill if exposed to disease; not immune or resistant to the disease.

symptom - sensation felt by the patient.

tetanus neonatorum - tetanus of newborn infants, usually due to infection of the umbilicus.

trend - the general course or direction.

under-reporting - the reporting of fewer cases of an illness than the number that actually occurred.

vaccination status - the stage of vaccination, such as fully vaccinated, partially vaccinated, or unvaccinated.

**WORLD HEALTH ORGANIZATION
IN COOPERATION WITH
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CENTER FOR DISEASE CONTROL**